DOCUMENT RESUME

ED 109 109	95	SP 009 358

AUTHOR	Dickson, George E., Ed.
TITLE	Research and Evaluation in Operational Competency-Based Teacher Education Programs.
INSTITUTION	Toledo Univ., Ohio. Coll. of Education.
SPONS AGENCY	National Center for Improvement of Educational Systems (DHEW/OE), Washington, D. C.; National Consortium of Competency Based Education Centers, Toledo, Ohio.; Office of Education (DHEW), Washington, D.C. Teacher Corps.
PUB DATE	75
NOTE	127p.
JOURNAL CIT	Educational Comment; n1 1975
EDRS PRICE	MF-$0.76 HC-$6.97 PLUS POSTAGE
DESCRIPTORS	Computer Programs; *Educational Research; Effective Teaching; Models; *Performance Based Teacher Education; Research; State Programs; Teacher Centers

ABSTRACT

This is a collection of papers presented at a 1974 conference on research and evaluation in operational competency-based teacher education (CBTE) programs. Two conceptual models for research and evaluation of CBTE activities were presented at the conference and the presentations of these models are the first two chapters of this collection: "A Comprehensive Medley-Soar Toledo Model for Research in Teacher Education" and "The Oregon College of Education--Teaching Research Division Paradigm for Research on Teacher Preparation." Four papers on support systems which must be involved in research and evaluation in CBTE follow: "A Computer Management System for Performance Based Curriculum (Comspec);" "Field-Based Support Systems for Research and Evaluation;" "From Rock Through Melon to Mush: The Place of the Teaching Center in Research and Evaluation;" and "Support Systems to In-Service CBTE Personnel, On Campus and Off Campus." The next paper is a discussion of the comprehensive research and evaluation model developed at the University of Toledo which is being used to evaluate the university CBTE program at both elementary and secondary teacher education levels. The final paper is a "Proposal for a Consortium of States to Develop a National Program to Improve Teaching Effectiveness." (Author/JA)

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EDUCATIONAL COMMENT 1 / 1975

Research and Evaluation In Operational Competency-Based Teacher Education Programs

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Edited by GEORGE E. DICKSON

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This is the report of one of a series of conferences developed and funded by the National Consortium of CBE Centers; the National Center for the Improvement of Educational Systems, U.S.O.E.; and Teacher Corps.

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FOREWORD

During the 1974-75 academic year, the eight member institutions of the National Consortium of Competency Based Education Centers sponsored conferences on a variety of topics related to Competency Based Teacher Education (CBTE). The conference, organized and held by the College of Education, The University of Toledo, Toledo, Ohio, on November 20 and 21, 1974, focused on **Research and Evaluation in Operational Competency-Based Teacher Education Programs.**

The two-day meeting attracted more than 100 college and university teacher education personnel and researchers from all sections of the United States. Two conceptual models for research and evaluation of CBTE activities were presented: (1) A Comprehensive Medley-Soar-Toledo Model for Research in Teacher Education and (2) the Oregon College of Education Teaching Research Paradigm for Research on Teacher Preparation. These two research models comprise the present, fundamental approaches to the evaluation and validation of operating CBTE programs. The presentations on these two models in the first two chapters of this monograph by Professors Robert Soar of the University of Florida and H. Del Schalock of the Teaching Research Division of the Oregon State System of Higher Education clearly delineate two similar, yet different, conceptual models for CBTE research which will become the basis for such research efforts involving questions of validity and accountability in the years ahead.

Accompanying the two major papers are four papers on support systems which must be involved in research and evaluation in CBTE. Dr. Paul D. Gallagher of Florida International University outlines the information-management-data support system used with CBTE operations at that institution. Dr. Gilbert S. Shearron discusses field-based support systems and raises important considerations in this area. Dr. Sam J. Yarger of Syracuse University provides the essential relationship of the teacher education center to CBTE research and evaluation. Dr. Karl Massanari discusses the particular need to provide inservice CBTE personnel, both on and off campus, with needed education and re-education to support a comprehensive research and evaluation effort.

University of Toledo personnel discuss the comprehensive research and evaluation model developed at The University of Toledo which is being used to research and evaluate The University of Toledo CBTE program at both the elementary and secondary teacher education levels.

The concluding paper by Dr. Frederick J. McDonald, Executive

Director of the National Commission on Performance Based Education, Educational Testing Service in Princeton, New Jersey, develops insight into the needed operational steps to create a research and evaluation system for CBTE. Dr. McDonald indicates how such research can be carried out in any location involved with CBTE using simple or complex procedures and with or without external institutional funding.

The contents of this monograph will supply the guidelines for future CBTE research and evaluation efforts whether these efforts be conducted by a single institution or by larger and more complex institutional arrangements. The subject addressed in the following pages is of the highest priority in continuing CBTE developmental efforts. A very useful contribution to CBTE literature and action is provided. Individuals and institutions involved with CBTE are urged to heed this call for action and accountability.

We wish to make a special acknowledgement of the continuing support and stimulation of Dr. Allen Schmieder, NCIES, U.S.O.E. and Dr. James Steffensen, Teacher Corps, U.S.O.E.

George E. Dickson
Dean
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THE MEDLEY-SOAR-TOLEDO MODEL FOR RESEARCH IN TEACHER EDUCATION

Robert S. Soar

It seems clear from this vantage point in time that much of the past research on relations between classroom experience and pupil growth has been handicapped by a conception which was too simple. We have suggested elsewhere that the model for educational research in the past may have been in error in that it looked for a small number of large effects, whereas the reality of the educational process may rather be that a large number of small effects are at work (Soar and Soar, 1973).

When numbers of classes of variables and sets of relationships are involved, a model is helpful in organizing the thinking process. A number of years ago, Mitzel (1960) proposed three classes of variables for dealing with the question of teacher effectiveness: presage, process and product. Presage variables included all the characteristics of the teacher before he entered the classroom, such as intelligence, age, sex, years of experience, degree status, graduate hours in education, etc.; process variables referred to measures of the nature of the interaction that occurred between the teacher and pupils within the classroom after the door closed, such as emotional climate, permissiveness, disorder, task orientation, etc.; and product measures, which were outcome measures for pupils, such as increase in reading or arithmetic skill, growth in positiveness of self-concept, a more favorable attitude toward school, etc. This delineation of classes of variables has been a very serviceable one for describing the nature of various studies of teacher effectiveness. Early studies, for example, were often presage-product studies, in which such variables as the experience, education or intelligence of the teacher were related to one or more pupil outcome measures. More recently, greater attention has been given to process-product studies, in which measures of classroom behavior have been related to measures of pupil outcome. Presage-process studies have also been carried out, of course, in which the characteristics of the teacher were examined in relation to the kind of classroom process which occurred in the teacher's classroom.

A recent use of this terminology occurs in the Dunkin-Biddle (1974) review, **Studies of Teaching**, in which these terms are used to classify studies for review purposes.

An Extended Model

More recently, Medley (1974) has extended this conceptual scheme

THE MEDLEY-SOAR-TOLEDO MODEL FOR RESEARCH IN TEACHER EDUCATION

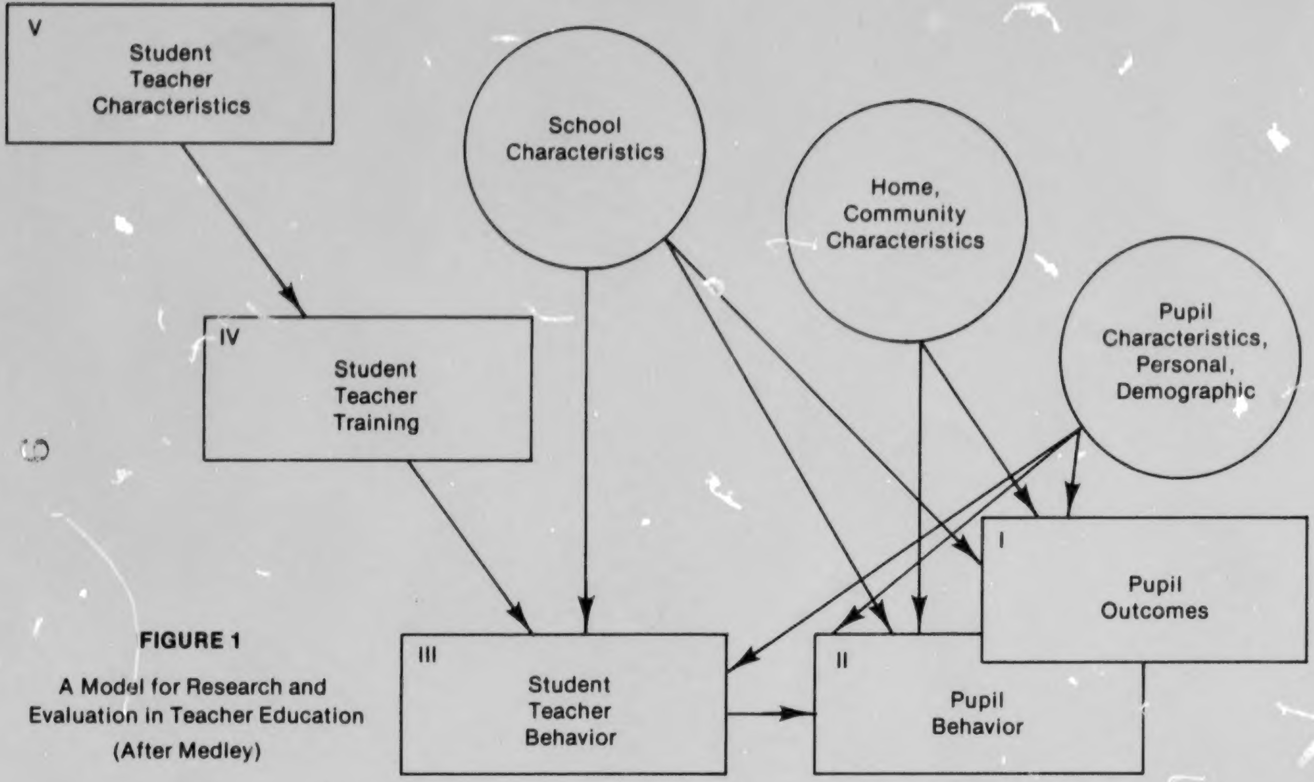
V
Student Teacher Characteristics
School Characteristics
Home, Community Characteristics
Pupil Characteristics, Personal, Demographic
IV
Student Teacher Training
I
Pupil Outcomes
III
Student Teacher Behavior
II
Pupil Behavior

FIGURE 1

A Model for Research and Evaluation in Teacher Education (After Medley) to represent more of the complexity of the classes of variables which impinge on the training and performance of the teacher, and the behavior and the outcomes of pupils in the classroom. That organizing scheme is the one which was used as the basis for planning the evaluation of the teacher education program at The University of Toledo.

Assessment Points—In Medley's model, and the modification shown in Figure 1, each of the rectangles represents an assessment point. They are numbered sequentially from pupil outcomes, the objective; with the rectangles numbered away from it representing increased distance from those outcomes. Pupil behaviors represent activities in which pupils must be involved in order to learn (or to attain other objectives). It will be recognized that in some instances pupil behavior is itself an objective, so that these two rectangles are shown as overlapping. That is, such things as involvement in some sort of learning task, supportiveness of behavior between pupils and pupil support of orderly classroom procedures would probably be taken as objectives in themselves.

Teacher behavior is represented as modifying pupil bahavior and, in turn, pupil outcomes. The arrow points both ways, however, indicating that teacher behavior is also influenced by pupil behavior. Teacher behavior, in turn, is an outcome of teacher training, and of student teacher entry characteristics.

Parenthetically, the model suggests a reason why the older presage-product studies may have so rarely produced meaningful results—namely, that there are three intervening complexes of influence which moderate the effect of teacher entry characteristics on pupil outcomes.

Examination of the model suggests that the behavior of the student teacher as he completes his training program is, in a very real sense, the central point of the model. It represents the transition from the college of education to the real world classroom. On the one hand, it is the outcome of the selection and training process; and on the other hand, it is the input to the public school classroom. It also seems useful here to make a distinction in terms which Medley suggested—that the term "program evaluation" be applied to the relationship between teacher selection and training and student teacher behaviors; and to restrict the term "program validation" to relations between student teacher behaviors and pupil behaviors or pupil outcomes. That is, program evaluation is the test of whether student teachers complete the program equipped with the knowledges and skills which the program intends; whereas program validation answers the question of whether the knowledges and skills the student teacher has learned make any difference in pupil outcomes.

Moderating Variables—The model represented here places greater emphasis on classes of variables which are, in a sense, external or "off-line" to the central process described above, yet which moderate the results at each of the assessment points in the model. In some cases, there is a rational or experiential basis for assuming that these off-line elements are important; in others there are research data indicating the importance of taking such variables into account.

Program Evaluation

In the sense in which the term is used here, program evaluation indicates the extent to which student teachers do in fact behave in ways intended as outcomes of the program, do, in fact, possess the knowledge and skill intended. There are two ways in which this can be assessed. It is clearly useful to have formative evaluations, represented by the performance of the student teacher in the various units or modules which comprise the training program, as is usual. But as Medley suggests, it is probably as important to have a summative evaluation at the end of the program as a kind of overall assessment of the student teacher's ability to "get it all together", which may be somewhat different from his ability to deal effectively with particular elements of the program separately. It seems desirable that this summative measure be made up of relatively objective, behavioral measures, which are extensive in number and variety, and which measure student-teacher behavior intended to support pupil growth in different kinds of objectives. These are points which will be elaborated later.

Given such multiple measures of student-teacher behavior, it would then become possible to evaluate programs in terms of the extent to which particular components of the training sequence appear to contribute to the student teacher's attainment of each desired performance. It may be useful to aggregate these various earlier formative measures into sub-groups—for example, it seems likely that training experiences which require the student teacher to interact with others may contribute to different skills from those training experiences which require him only to acquire cognitive skills. Activities requiring group participation, that is, may differ as a class from essentially individual learning experiences in the skills which are supported.

In addition, the entry characteristics of the student teacher seem likely to be of interest as predictors not only of student teacher behavior, but also of the kinds of training experiences which may be most useful to him. It would not be surprising, for example, if the shy, retiring student were more inclined to choose individual activities than activities which involved interaction with others, wherever the program offered such a choice. The first question to ask would be whether choices followed these

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expectations. A second question, perhaps of more interest, would be whether student teacher behavior appeared to be a joint function of the training experiences the student teacher has had and his characteristics as he entered the program; and if so, if one appeared to be more powerful than the other.

If entry characteristics of the student teacher were not known, it could easily happen that the individual activities chosen by the student would be "credited" with his lack of interactive skill, when the entry characteristic was actually a related factor, perhaps the principal one.

Where training options such as the one described exist for student teachers, it will probably be useful to plan small experiments in which students with different entry characteristics would be randomly assigned to different training experiences, in order to examine the possibility that a student might profit most from the sort of experience which he is least likely to choose. As a general statement, it seems possible that entering characteristics of the student might to a degree influence the training experience which is most useful for him. This is the logic of the aptitude treatment interaction (ATI) studies.

Although the contributions made by past studies of teacher characteristics have not been great, it seems possible that the simultaneous analysis of teacher characteristics and teacher training experiences might be more successful in predicting teacher behavior that either set of measures alone would be. There is also the possibility that some of the more recent measures of teacher characteristics might be more serviceable than those employed in older studies. For example, there is recent evidence that teacher conceptual level (Harvey, Prather, White and Hoffmeister, 1968) predicts some aspects of teacher behavior in the classroom to an encouraging degree.

As extreme examples of the need to recognize entry characteristics in training programs, it seems unlikely that all teacher education candidates would find teaching in a classroom modeled after the British Infant School congenial, nor in a classroom taught by contingency management (or behavior modification, behavior analysis or precision teaching) and programmed materials.

Moderating Variables

There is evidence that the behavior of the student teacher in internship is influenced by that of the cooperating teacher with whom he is placed (Amidon, 1968), as would be expected. Indeed, it seems likely that this is one of the more powerful influences on the behavior of the student teacher. Similarly, it is commonly believed that the behavior of the teacher following training is influenced by the attitudes and beliefs about teaching which typify the school in which he is employed. Although they have not been published, incidental findings from some of our work and some of Medley's show "school effect" to be relatively strong—that is, that teaching behavior within schools is more homogeneous than across schools. This may be a function of selection of teachers, to a degree, of course, but the principal and the teacher's lounge seem likely to be strong contenders.

It also seems reasonable that the behavior of the teacher might vary with the nature of the pupil group assigned to him. There is some evidence in support of this, although its interpretation is uncertain. In two sets of data in which a variety of measures of pupils were taken in the fall and again in the spring, and observational data were collected in the classrooms during the year, there were numbers of moderately strong relationships between the pretest pupil class means and the classroom behavior observed at mid-year. In general, there was closer control by the teacher, less freedom and initiation by the pupils (and in first grades, somewhat less task orientation), when pupil entering scores were low on measures of social status, readiness, ability, or achievement (Soar and Soar, 1973). The relationships could, of course, reflect selective placement by the school administration, but they also follow a pattern which probably many educators would expect to find.

Program Validation

The Need for Validation

Although all aspects of the research implied by this model are difficult and expensive, it seems highly probable that the program validation aspects of it will be the more difficult and the more expensive. But it also seems likely that program validation is the most critical. As numbers of writers have pointed out, the research base that we currently have for saying that one kind of teacher behavior is more likely to lead to pupil growth than another is discouragingly thin and uncertain. There seems little question that programs must be developed and evaluated on the basis of current theory and what knowledge exists, but it seems equally clear that this process is a calculated risk. A calculated risk, that is, in that to the extent that theory and present knowledge are weak, we may be committing large expenditures of time, effort and money to programs which will develop skills in student teachers which will ultimately make no difference to the pupils they teach. Although this possibility is distressing, it does not appear to be an unreasonable one.

As an example of the weakness of present theory, it seems to us that the two innovations which are currently receiving most attention in schools are the movements toward "open" classrooms (however that term is defined) and toward contingency management teaching (or its alternative labels). Both claim support from current theory and research yet the two are so totally different in orientation and in procedure as to raise serious questions about the theory or research base which supports both.

The whole history of research on teacher effectiveness is a testimonial to the difficulty of demonstrating that the beliefs we hold about teaching behavior do, in fact, make a difference. A salient example is the review by Medley and Mitzel (1959) of all of the studies they could find in which ratings of teacher effectiveness which had been made by supervisors and administrators had, in turn, been related to any reasonably objective measures of growth on the part of the pupils these teachers taught. With high consistency, there were no relationships between the ratings and the growth of pupils. These findings indicate that presumably knowledgeable people could not go into a classroom and know whether learning was taking place or not. If the ratings, in turn, reflected sets of beliefs about classroom practices which lead to learning, then the beliefs appear to be in question as well. While these results are relatively old, it seems reasonable to raise the question of how much the kinds of beliefs on which programs are being built have changed from then until now.

At the same time, it may be that the beliefs are really correct—that the behaviors believed to facilitate growth of pupils really do—but that the research studies which have tested the relationships have not demonstrated these associations with consistency because of design weaknesses. While this may be the case, it is not very reassuring in terms of the dependability of current knowledge as a basis for program building.

And there is some evidence that raises questions about current beliefs. In three sets of data, we have found evidence that as teachers work more frequently with pupils at the higher cognitive levels of Bloom's taxonomy (Bloom, 1956), pupil gain in achievement decreases. That is, there is a negative relationship between the amount of interaction at high cognitive levels, and pupil gain, even for fairly complex measures of achievement. Sometimes this effect appears for all pupils, sometimes only for low socio-economic status pupils, but it appears frequently (Soar and Soar, 1972, 1973).

This is not to conclude that a teacher should interact only at the lower levels, but it does imply that it is possible for a teacher to interact too often at too high a level, perhaps leading to frustration, lack of self-esteem, and lower achievement gain on the part of pupils. The need for a "match" between where the pupil is and where the teacher is seems obvious, but how many programs caution teachers in training about working at too high cognitive levels?

Similarly, there are numbers of recent replications of the finding that there are optimal amounts of some kinds of teacher behaviors which are associated with greatest pupil growth, and that greater or lesser amounts of these behaviors are associated with decreased pupil growth (Brophy and Evertson, 1974; Soar, 1968; Soar and Soar, 1973).

But how many programs specify limits for the behavior which is desired—or is the "more is better" concept usually assumed?

Methodological Problems

The number of methodological difficulties in validating teacher behaviors is great, but their neglect may account for the limited state of our knowledge.

Pupil Growth Time Period—It seems likely that relations between teacher behavior and pupil growth may change as the length of the time period of pupil growth changes, but validation of a set of teacher behaviors in terms of growth in pupils will surely be easiest if the period of teaching time is relatively brief. As a consequence, there is current interest in short "evaluative teaching units" (Flanders, 1974) in which some of the problems of measuring pupil gain are avoided by basing the teaching unit on materials for which it seems reasonable to assume no knowledge on the part of the pupils, so that pupil achievement at the end of the unit can be assumed to be largely if not completely a function of the teaching unit.

But it seems doubtful that the teaching skills which start pupils from "ground-zero" in an area of knowledge new to them can be generalized to the classroom situation in which part of the teaching task is to integrate the new knowledge into pupils' past knowledge, so as to build on it. An additional problem is that of taking account of the fact that pupils in the usual classroom differ widely in where they are.

Empirically, McDonald (1974) reports that student teacher performance in mini-courses cannot be predicted from performance in micro-teaching, which raises a problem in the use of short teaching units for assessment with the intent of generalizing to the school year.

The problem is further complicated by evidence which suggests that classroom behavior which best supports pupil growth during the school year may be different from the behavior which is associated with pupil growth the following summer. If pupil growth over the summer were minor, this would be unimportant, but there is evidence that practically important amounts of growth for some pupils occur during the summer while the pupil is out of school (Soar and Soar, 1969, 1973; Hayes and Grether, 1969).

Measuring Pupil Gain—Another problem whose difficulty is not always recognized is that of measuring pupil gain. The usual procedure is to administer a pretest and a posttest, and adjust the posttest score for standing on the pretest. The procedures used for the adjustment are typically analysis of covariance, or regressed or residual gain. But there are difficulties with these procedures which are not widely recognized. The major one is that if the groups within which the adjustment is to be made differ in pretest mean, the adjustment will be biased. Campbell and Erlebacher (1970) develop the nature and the reasons for this effect in careful detail, showing that where there is equal change in two groups which differ in pretest mean, the adjustment made by covariance creates a difference favoring the high prescoring group. The same effect, of course, will hold for regressed gain. This means that the usual procedure of applying covariance to pupil gain data from a number of classrooms will add a spurious component of gain to the higher standing classrooms, with the amount added being related to how high the classroom stood on pretest. McLean (1974) has explored the details of this problem further, and found that the Porter adjustment, which Campbell and Erlebacher recommend, still permits the spurious adjustment to occur.

The second problem which is inherent in measuring gain is that the measure of gain is much less reliable than the measures of pretest or posttest standing. When data are aggregated to the level of classroom means, the problem is lessened, but for the data of individual pupils it can be severe. It seems likely, as well, that the reliability problem will be less severe for subject-matters which are sufficiently technical or unusual that pupils start essentially from zero in the learning which the gain measure represents. This is the logic of the evaluative teaching unit (Flanders, 1974), and one of the major arguments favoring it.

Other Influences on Pupil Gain—Although reports of educational outcomes often do not reflect it, there is widespread recognition that the scores pupils earn at the end of the school year are much more strongly influenced by such factors as the pupil's pretest score, his IQ, and his socio-economic status than by the influence of the classroom. But even if the effects of these influences are eliminated statistically, other influences such as the attitudes toward education expressed in the home and by the pupil's peer group, and even the size of the community have influence on achievement gain ranging from moderate to strong (Garber and Ware, 1972; Anderson, 1970; Soar and Soar, 1973).

The problem, of course, is that unless the validation design and the analysis of the data recognize and take account of these other sources of influence which are relatively strong, the influence of the teacher, which is relatively weaker, is not likely to be adequately represented.

Nonlinear Relations Between Teaching Behaviors and Pupil Outcomes—In past researches, the effect of teacher behavior on pupil outcomes has most often been assessed either by calculating product moment correlations between the teacher behaviors and the pupil outcome measures or by identifying groups of teachers who are high or low on the behavior of interest and testing whether there was a corresponding difference in a pupil outcome, using the t test. The use of the correlation coefficient as an index of association assumes that a linear relationship holds—that is, that as the teacher behavior increases, the pupil outcome increases, without limit. The assumption is that if some of the behavior is good, more is better. Stated in this fashion, this "more is better" assumption does not seem very reasonable, and several recent analyses have verified this (Solomon, Bezdek and Rosenberg, 1963; Coats, 1966; Soar, 1968; Soar and Soar, 1972, 1973). The class of variables for which this form of relationship has sometimes been found is that of teacher behavior which limits or restricts the freedom of pupils, in contrast to that of giving them greater freedom of choice. The form of the relationship is one in which, starting from classes which are tightly controlled, as pupil freedom increases across classrooms, achievement also increases, but only up to a point; beyond that point, greater amounts of freedom lead not to greater increases in gain but to decreases in gain.

Multiple Pupil Outcome Measures—Another aspect of the validation problem which is widely known but infrequently recognized in validation designs is the need for multiple pupil outcome measures. While many of the objectives for which the school has accepted responsibility are not easily measurable, or in some cases are not measurable at all, a broader gamut of measures is available than is commonly employed. For example, there are serviceable measures of self-concept, and of the attitude of the student towards school. There are also achievement measures which differ in the complexity of the objective measured, for which there is some evidence suggesting that the achievement of complex cognitive processes such as abstracting, inferring, or applying generalizations to solve new problems, is best achieved under a somewhat different style of classroom teacher behavior than is a simpler objective such as memorizing the multiplication table or dates in history (Solomon, Bezdek and Rosenberg, 1963; Soar, 1968; Soar and Soar, 1972, 1973). It seems probable that the current emphasis on criterion-referenced measurement, with its attendant concern for small-step learning will be accompanied by an emphasis on simpler, more immediate kinds of pupil learning. It is relevant to ask whether these are the learning objectives which are most highly valued, and if not, to assure that more complex, longer-term measures of pupil cognitive growth are made a part of the validation battery.

Interacting Relationships—Relationships between teacher behaviors and pupil outcomes are further complicated by the finding that with some frequency the response a pupil makes to a given teacher behavior depends on his characteristics at the beginning of the year; that is, different pupils respond differently to the same teacher behavior. Good teachers have always known this, of course, but researchers have been slow to take this phenomenon into account.

Probably the best validated interaction is that between the socio-economic status of the pupil and various kinds of teaching behaviors (Soar and Soar, 1973; Brophy and Evertson, 1974). Low social status pupils are apparently more sensitive to affect expression in the classroom, with evidence of greater growth with positive affect, and decreased growth with negative affect, in comparison with high social status pupils. Another illustration is the interaction of social status and cognitive level. Low social status pupils show a decrease of subject-matter gain where larger amounts of classroom interaction are at the higher levels of Bloom's taxonomy. As indicated earlier, this result appears for all pupils for some outcome measures but only for low social status pupils in other cases. In addition to this finding with respect to Bloom's taxonomy of the cognitive domain, there is evidence from another observation system that experimental teaching (in the Deweyan sense), which presents the pupil with challenging questions which "stump" him and cause him to sit, think, and "mull" have similar negative influences for low social status pupils.

There is also evidence that a form of teacher control of pupil behavior which is gentle and unobtrusive facilitates the cognitive growth of low social status pupils when present in larger amounts than is most facilitative for the growth of high social status pupils.

There is also evidence of differential response to classroom process by pupil groups differing in anxiety, motivation level, and size of community (Soar, 1968; Soar and Soar, 1973).

Finally, as another aspect of the complexity of relationships between teacher behavior and pupil outcomes, it is frequently true that a teacher behavior measure which by itself is essentially unrelated to pupil outcome may become related to that pupil outcome, sometimes strongly, when other variables are held constant statistically. While this idea seems initially confusing, on reflection it seems eminently reasonable. What it reflects is that a classroom behavior of more subtle influence may be obscurred by other classroom behaviors whose effect is more prominent, yet may all the same be significantly related to pupil outcome—even strongly—when the others are controlled or held constant. In effect, to know the influence of one classroom behavior, others must be held constant. Put in this way, the result seems more reasonable. In real classrooms, this condition is rarely met, so that statistical control becomes necessary.

Parenthetically, this finding may be one of several reasons for the frequency with which earlier studies of teacher behavior failed to find significant relationships with pupil gain. If other unmeasured variables were the more powerful ones, the measured one could be masked or obscured so that its effect was no longer shown.

It seems unlikely that the teacher will be able to change his teaching to take account of the degree of complexity cited here, especially the interactions which indicate that different pupils should be taught differently, but unless an evaluation or validation design takes this complexity into account, it risks learning nothing.

Analyzing the Data

The preceding sections have suggested the importance of examining simultaneously numbers of measures of classroom behavior, along with characteristics of the pupil, the community and the school, along with pupil behaviors and pupil outcomes. Analyses such as these, including interactions and nonlinear relationships, would be difficult if not impossible to carry out using traditional methods of analysis of variance and covariance. Apart from the complexity of the analysis, non-orthogonality of the factors and the limited number of degrees of freedom would make it impossible to carry such analyses very far in most real-world situations. But more recently, multiple regression has been recognized as an alternative method of analysis which will give results identical to analysis of variance when the assumptions for the latter are met, and which will still produce meaningful results with correlated factors. In addition to conserving the information which is lost when continuous variables are cast into categories, degrees of freedom are conserved as well, in that any continuous measure can be described by one degree of freedom. As an example, two behavior factors, each at four levels, and the interaction between them, would use up fifteen degrees of freedom in a conventional analysis of variance, whereas multiple regression could test the same three hypotheses requiring only three degrees of freedom. In addition, interactions and non-linear trends are easily tested, and the time and effort required to process the data are minimal.

Where the skills and the degrees of freedom are available, extension of these methods to multivariate designs offers further increase in power. Summary statements of the usefulness of this procedure are available in Cohen (1968) and Walberg (1971), with a more complete statement by Kelly, Beggs, and McNeil (1969). The source which is simultaneously most conceptual and most practically detailed is Kerlinger and Pedhazur (1974).

A Concluding Comment

This is a demanding picture of the requirements for program evaluation and validation. Much of the data collection for program evaluation would go on within the program itself—would be necessary, in fact—and little more than further analysis of the data would be required. But validation will surely require additional, expensive data collection and analysis. And in both cases, it seems likely that considerable amounts of data on moderating variables would be desirable. We commented earlier that reality in the classroom is probably best represented by the cumulative effect of many small influences; we would add to that the idea that the relations between these influences are often nonlinear and interacting.

This degree of complexity is not advocated with the hope that the findings will all be implemented in teacher behavior. But we suspect that our evaluation and validation designs will need to be complex in order to be productive at all. As Stanley (1966) has quoted Fisher,

> *No aphorism is more frequently repeated in connection with field trials, than that we must ask Nature few questions, or ideally, one question at a time. The writer is convinced that this view is wholly mistaken. Nature, he suggests, will best respond to a logical and carefully thought out questionnaire; indeed, if we ask her a single question, she will often refuse to answer until some other topic has been discussed.* (P. 224).

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THE OREGON COLLEGE OF EDUCATION — TEACHING RESEARCH DIVISION PARADIGM FOR RESEARCH ON TEACHER PREPARATION

H.D. Schalock and G.R. Girod

The position has been taken in a recent monograph (Schalock 1975) that competency based education and teacher education programs hold unusual promise as contexts for research. If properly organized, and if measures of competence are of sufficient quality, they represent contexts wherein research can be carried out at low cost and high external as well as internal validity. This is a condition that has never before existed in education or teacher education, and if established represents for the first time the possibility of the profession moving to an empirically based mode of operation.

The position has also been taken in the monograph, however, that attempting to combine research and program operation is a complex and often risky venture. Competence measures of a quality that permits them to be used in research, for example, are costly and difficult to obtain. Controlling for sources of unwanted variation through use of experimental and control groups places constraints upon program operators that are often frustrating if not intolerable. As a consequence of such complexities, at least five conditions seem to be needed if an ongoing teacher preparation education program is to serve as the context for research:

Persons responsible for the management and operation of the program must be inclined toward experimentation. *Commitment to empiricism and the desire to know must be dominant features of the context. Research must be viewed as an integral part of program operation, and as such viewed as a continuous, necessary and desirable part of the program.*

Persons responsible for the management and operation of the education program must view it as subject to continuous change, and view a systematically designed program of research on its effectiveness as a major data source for its change. *When viewed in this way, research can have both the immediate and applied value needed for support by those responsible for program operation.*

Data of a quality that will support trustworthy research must

> **be collected as a normal part of program operation.** *Accurate, reliable descriptions of program operations must be provided and accurate, reliable measures of learning outcomes must be recorded as a matter of course.*
>
> **Sophisticated data management, storage, retrieval and display capabilities must be available.** *Data to be used for research, program operation and program adaptation purposes must be routinely stored on computers and routinely retrieved in formats that support program related decision making and research.*
>
> **There must be an advisory structure to insure that the research that is pursued has value to persons in the program as well as to the profession at large.**

Contextually valid, experimental research lays heavy demands on ongoing educational programs, and unless the context within which a program rests is special in many ways the demands of research simply cannot be met.

Since fully operational CBTE programs are only now coming into existence, it is premature to look for examples of programs already functioning as research contexts. Energies and resources beyond those required for program operation have been directed largely to program development. Moreover, even if energy and resources were available for research, few programs have developed measures of competence of a quality that permits them to be used for purposes of research.

Be this as it may, the Oregon College of Education—Teaching Research (OCE-TR) Center for Competency Based Education has begun to direct attention to the research function. Though incomplete in its development, it has progressed to the point where its description as a research context is possible. The program as it now stands is prototypic of the kinds of contexts envisioned ultimately for a reasonable number of CBE programs.*

The Competency-Based Elementary Teacher Education Program at Oregon College of Education as a Context for Research

Within the OCE-TR Center it is the elementary teacher education program that has been developed thus far as a context for research. This program meets most of the recommendations outlined above in that:

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*Other CBE Centers are engaging in research activities, for example, The University of Toledo, Florida State University and the University of Wisconsin, but, with the exception of Toledo, these centers have not as yet taken steps to organize explicitly as contexts for research.

> It has the public commitment of staff and administrators to the research function;
>
> It has the public commitment of staff and administrators to the program being subject to continuous change, and for the direction of change to depend to a large extent upon the results of research on program effectiveness;
>
> It calls for the systematic collection of data for use in research on (a) the characteristics of the ETE program (curriculum organization); (b) the characteristics of students in the program (traits, background experiences); (c) the knowledge, skill and demonstrated teaching competence of students in the program; (d) the behavior and learning outcomes of pupils taught by students in the program; and (e) the characteristics of the setting in which teaching occurs;
>
> It calls for the maintenance of quality in all measures taken in the program through continuous quality assurance studies;
>
> It has a computer based data management system that supports all research and quality assurance studies;
>
> It has an advisory structure that insures that the research pursued in the program has value to the profession at large as well as those in the program, and at the same time reflects a level of quality that sets a standard for research in the profession; and
>
> It maintains a support structure through the college and the Teaching Research Division of the Oregon State System of Higher Education that provides assistance to individual staff members doing research.

Other features of the program that add to its uniqueness as a research context are: (a) the OCE faculty has defined teaching competence as the ability to bring about the outcomes expected of a certified teacher holding a certificated teaching position; (b) the ability to bring about such outcomes must be demonstrated in ongoing school contexts; and (c) the most critical competence to be demonstrated in this regard is the ability to bring about desired learning outcomes in pupils. In addition, the OCE program is organized in such a way that blocks of 30 students can be systematically treated as experimental or control groups (each block of students is viewed as an "instructional unit" within the program). All faculty in the program have accepted common definitions, measures and performance standards relative to the teaching competencies to be demonstrated by graduates of the program. Moreover, all faculty have agreed to try alternative instructional programs and procedures to help students achieve competence as teachers, but to carefully document all programs and procedures tried. Approximately 240 students are enrolled in the elementary teacher education program at the college each year, providing at least eight instructional units for treatment as experimental or control groups each year.

The development of an assessment system that is in keeping with the demands of the definition of teaching competence that is outlined above, and that provides data of a quality that permits it to be used for purposes of research, is one of the major contributions of the OCE Elementary Teacher Education Program to the profession. Four features of the system have been central in its evolution: (a) it is organized around competency demonstration contexts; (b) it relies on highly inferential judgments by college and school supervisors as to quality of performance in relation to particular teaching functions (competencies) within demonstration contexts; (c) it requires that the indicators relied on in making such judgments be identified; and (d) performance standards for competency demonstration are linked to demonstration contexts as well as individual competencies. In combination, these features of the assessment system lead to a powerful set of dependent measures for use in research carried out at the center.

The rationale for and the early development of the assessment system are described in a recent publication of the Multi-State Consortium on Performance-Based Teacher Education (Schalock, Kersh and Garrison, 1974). Copies of the forms, standards and user guides that comprise the system may be obtained upon request from the Teaching Research Division, Oregon State System of Higher Education, Monmouth, Oregon.

Notes On The Research Paradigm

Longitudinal Characteristics

Central to the OCE-TR paradigm for research on teacher preparation is a commitment to a longitudinal research strategy. Each teacher graduating from the OCE Elementary Teacher Education

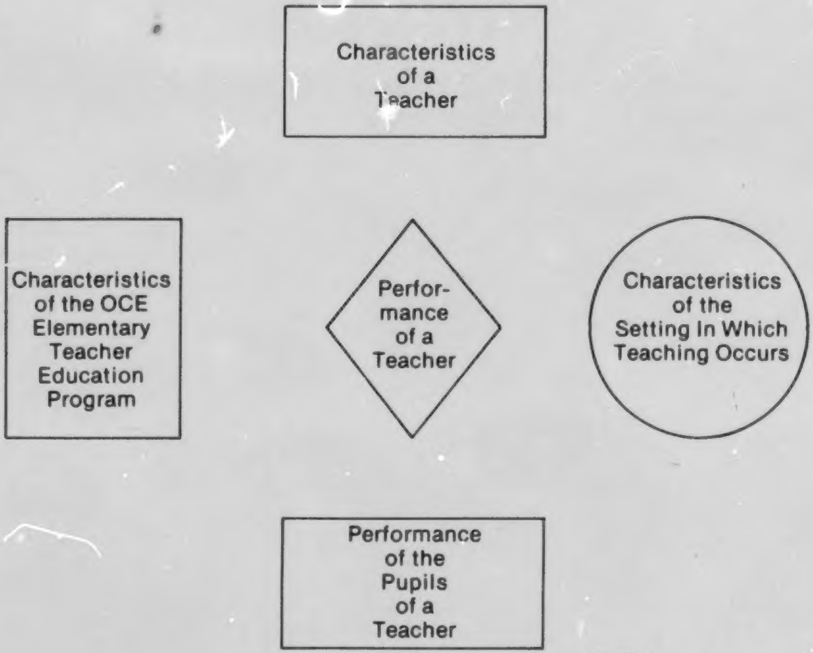
Program is assessed for his or her competence as a teacher on at least six separate occasions. Three of these occur prior to graduation from the program; three follow graduation. Scheduled assessments of performance as a teacher are as follows:

Prior to graduation
- Lesson teaching
- Short Term (2-5 days) Full Responsibility teaching
- Extended (2-5 weeks) Full Responsibility teaching

After graduation
- During the first full year of teaching
- During the second full year of teaching
- During the fifth full year of teaching

Multi-Dimensional Characteristics

Five major sets of data are called for in the paradigm. These are: (a) data on the background and personality characteristics of students preparing to be teachers; (b) data on the characteristics of the teacher preparation program; (c) data on performance as a teacher; (d) data on critical features of the setting in which teaching takes place, including the characteristics of pupils being taught; and (e) data on the learning


Characteristics of a Teacher
Characteristics of the OCE Elementary Teacher Education Program
Performance of a Teacher
Characteristics of the Setting In Which Teaching Occurs
Performance of the Pupils of a Teacher

outcomes of pupils being taught. In combination, these five sets of data permit an essentially endless array of questions to be asked in relation to the elementary teacher preparation program at OCE, and the effectiveness of teachers graduating from that program. The data sets can be portrayed schematically as shown below. The various kinds of research questions that can be asked using these data sets are illustrated by the review later in the document of the research that is currently underway at OCE.

Table 1

A Summary of Variables on Which Measures are Taken in the OCE-TR Paradigm for Research on Teacher Preparation

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TEACHER CHARACTERISTICS VARIABLES

Background Characteristics
- SES
- Birth Order
- Experience with children

Physical Characteristics
- Sex
- Age
- Body Type

Scholastic Ability
- College GPA
- SAT Scores
- Scores on the abstract-concrete thinking scale of the 16 PF test

Personality Characteristics
- Selected measures from the 16 PF test
- Selected measures from the Edwards Personal Preference Inventory
- Selected measures representing various combinations of 16 PF and Edwards scores

Attitudinal Characteristics
- Attitudes toward self
- Attitudes toward teaching in general
- Attitudes toward selected aspects of teaching

Preferred Learning Style and Cognitive Orientation

TEACHER PERFORMANCE VARIABLES*

Competency Cluster I. Planning and Preparing for Instruction
  General Planning
    1.1 Thoroughness
    1.2 Appropriateness
  Special Unit Planning
    1.3 Desired learning outcomes
    1.4 Indicators of outcome achievement
    1.5 Strategies, materials, and procedures
Competency Cluster II. Performing Instructional Functions
    2.1 Conveying learning outcomes desired from instruction
    2.2 Adapting instruction to context
    2.3 Building motivation and interest in learning
    2.4 Providing for variety in instructional activities and levels of thinking

Table 1 (continued)

2.5 Dealing with subject matter
2.6 Managing the use of instructional materials, procedures and activities
2.7 Managing potentially disruptive events
2.8 Managing transitions and terminations
2.9 Assessing learning outcomes
2.10 Planning instruction on the basis of learning outcomes

Competency Cluster III.
Summarizing and Interpreting Learning Outcome Data
3.1 Summarizing data
3.2 Interpreting data
3.3 Using data to plan next steps

Competency Cluster IV. Relating Interpersonally
4.1 Responding to pupils concerning instructional matters
4.2 Responding to pupils concerning personal matters
4.3 Relating to supervisors, principals, curriculum specialists, etc.

Competency Cluster V. Performing Related Professional Responsibilities
5.1 Managing non-instructional activities
5.2 Meeting work schedule demands
5.3 Maintaining the learning environment

PUPIL OUTCOME VARIABLES

Process Outcomes
6.1 Pupil involvement in the instruction-learning process
6.2 Pupil feelings about the instruction-learning process
6.3 Pupil responsiveness to the teacher

Product Outcomes:
From a 2-5 week Full Responsibility Teaching Experience
7.1 Knowledge and skill outcomes
7.2 Attitudinal outcomes
7.3 Other outcomes, for example reading skill and comprehension outcomes; problem solving and social interaction outcomes

Product Outcomes:
From a diagnostic-developmental project with three or more individual children

DESCRIPTORS OF THE SETTING IN WHICH TEACHING OCCURS

Characteristics of the School in Which Teaching Occurs
- Location
- Organization of space
- Organization of curriculum
- Organization of faculty

Characteristics of the Classroom in Which Teaching Occurs
- Number of pupils
- Pleasantness of surroundings
- Availability of materials

Characteristics of Pupils Taught
- Model age
- Grade level

Table 1 (continued)

- Ratio of boys to girls
- Ratio of children with above average intelligence
- Ratio of children from above average socio-economic families
- Ratio of children from Caucasian parents

DESCRIPTORS OF THE OCE ELEMENTARY TEACHER EDUCATION PROGRAM
(To be provided by individual staff members doing research on program effects).

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*The dimensions of performance listed are those that appear in the assessment system used at the point of entry into the profession (INITIAL Certification). The system is presently being extended to cover advanced levels of certification.

Multi-Measure Characteristics

Each data set within the paradigm contains within it measures of a number of separate but related variables. In addition, each variable within each data set contains a number of separate but related measures. This "multi-measure" strategy is consistent with the recommendation of Campbell and Fiske (1959) that constructs under investigation in the behavioral sciences carry more than one operational definition. An outline of the variables included within each data set is presented in Table 1.

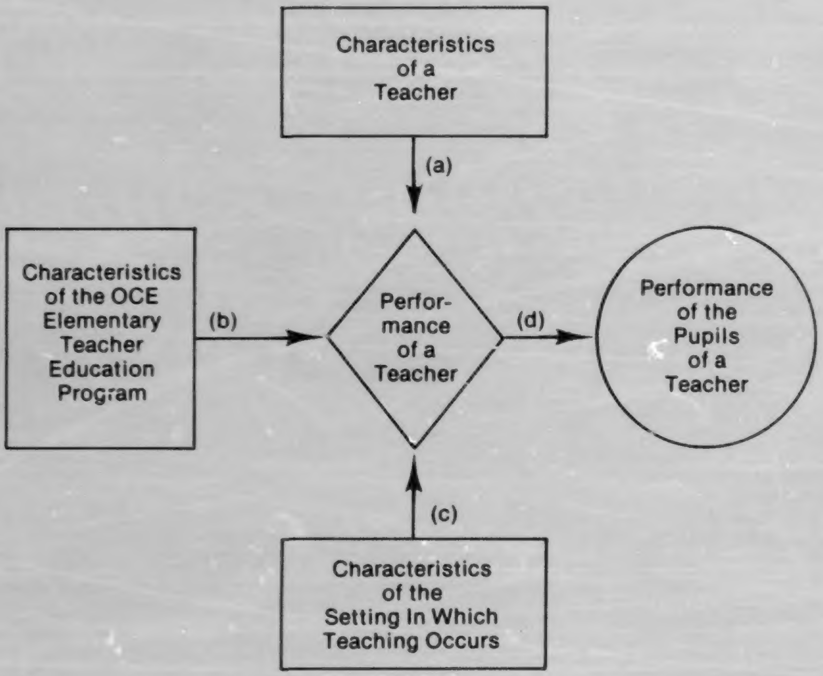
Model-Dependent Characteristics

The data sets within the paradigm, and the variables within each set, are referenced against (but not dictated by) three "models" that pertain to the preparation of teachers. These are (a) the OCE model of an effective elementary teacher; (b) the Spady model of an effective teacher; and (c) the Schalock model of the critical variables involved in instruction. The content of these three models is outlined in the schematics attached.

Classes of Research Questions That Can Be Asked When Using The Data Sets Called For In The OCE-TR Paradigm For Research On Teacher Preparation

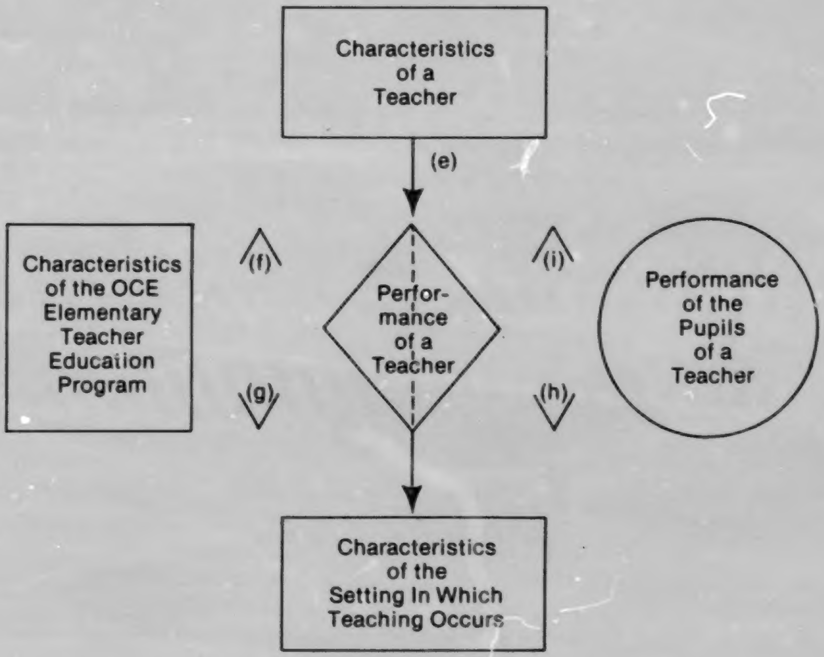
Questions Involving Two Data Sets

Four kinds of questions can be asked that involve two of the data sets called for in the paradigm: (a) the relationship between teacher characteristics and teacher performance; (b) the relationship between program characteristics and teacher performance; (c) the relationship between teacher performance and the characteristics of the setting in which teaching occurs; and (d) the relationship between teacher performance and pupil performance. All are important and appropriate questions to ask, and all are questions that can be answered with equal ease by using the data sets called for within the OCE-TR paradigm. Schematically, questions involving two dimensions of the paradigm can be illustrated as follows:


Characteristics of a Teacher
(a)
Characteristics of the OCE Elementary Teacher Education Program
(b)
Performance of a Teacher
(d)
Performance of the Pupils of a Teacher
(c)
Characteristics of the Setting In Which Teaching Occurs

Questions Involving Three Data Sets

Five kinds of questions can be asked that involve three of the data sets called for in the paradigm. These are: (e) the relationship between teacher characteristics and teacher performance, when variation in performance is controlled for variation in the setting in which teaching occurs; (f) the relationship between program characteristics and teacher performance, when variation in performance is controlled for variation in teacher characteristics; (g) the relationship between program characteristics and teacher performance, when variation in performance is controlled for variation in the setting in which teaching occurs; (h) the relationship between teacher performance and pupil outcomes, when variation in performance is controlled for variation in the setting in which teaching occurs; and (i) the relationship between teacher performance and pupil outcomes when variation in performance is controlled for variation in teacher characteristics. The linkage of data sets involved in these analyses can be illustrated as follows:

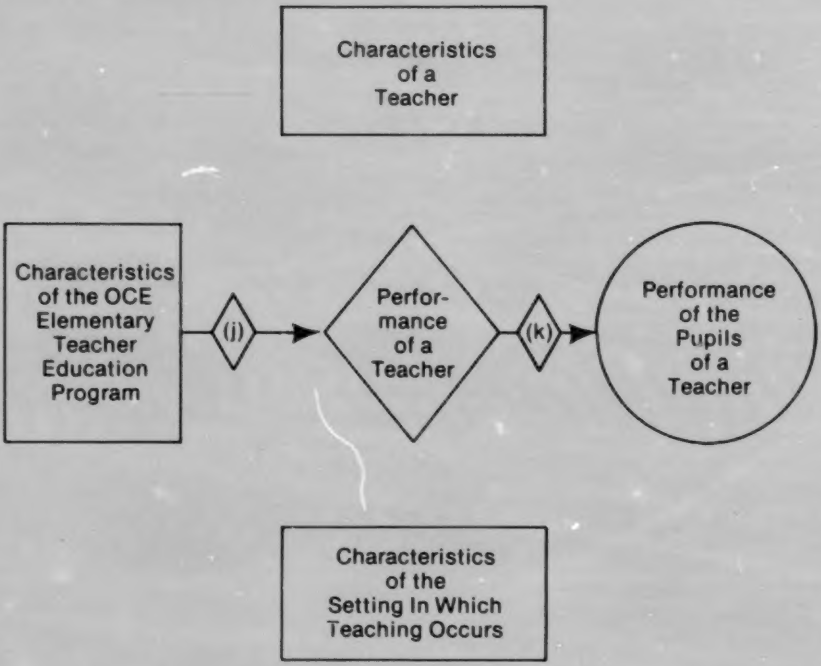

Characteristics of a Teacher
(e)
Characteristics of the OCE Elementary Teacher Education Program
(f)
(g)
Performance of a Teacher
(i)
(h)
Performance of the Pupils of a Teacher
Characteristics of the Setting In Which Teaching Occurs

Questions Involving Four Data Sets

Two kinds of questions can be asked that involve four of the five sets of data called for in the paradigm. These are (j) the relationship between program characteristics and teacher performance, when variation in performance is controlled for both variation in teacher and setting characteristics; and (k) the relationship between teacher performance and pupil outcomes, when variation in performance is controlled for variation in teacher and setting characteristics. The linkage of data sets involved in answering questions of this kind can be illustrated as follows:

Questions Involving Change In Paradigm Related Measures Across Time

In addition to questions that focus on the relationships that exist between the major data sets within the paradigm it is possible, and probably desirable, to raise questions as to change in the measures within any particular data set from one time to another. Particularly important in this regard are questions of change in teacher


Characteristics of a Teacher
Characteristics of the OCE Elementary Teacher Education Program
(j)
Performance of a Teacher
(k)
Performance of the Pupils of a Teacher
Characteristics of the Setting In Which Teaching Occurs

characteristics and teacher performance. Obtaining answers to such questions, of course, requires careful control for the effects of the setting in which teaching occurs. Such analyses are possible within the OCE-TR paradigm, however, for measures of setting always accompany measures of teacher and pupil performance.

Research Studies, 1974-75

A number of substantive and methodological studies are underway. Most of these, however, are exploratory or developmental in nature for many of the constructs and measures needed to implement the research called for are still missing. Recognizing this limitation the substantive studies planned for the 1974-75 academic year are listed in Table 2. The methodological studies planned for the year are listed in Table 3.

Assuring Quality in Competency Assessment

Confidence in the Elementary Teacher Education program at OCE as a context for research depends in large part on the confidence that can be placed in the measures of teaching competency collected within it.

These measures serve as dependent or criterion measures in the majority of research studies undertaken within the OCE context (see Table 2), and as a consequence great care is taken to insure that the competency measures obtained are of highest quality.

From the outset of the ETE program quality assurance procedures have been a regular part of its operation. By and large these procedures are of three kinds: (a) the preparation of personnel to apply the competency assessment system; (b) the continuous feedback of information to supervisors about the conscientiousness with which they are using the forms and procedures provided for competency ratings, the reliability and sensitivity of the ratings made, the indicators relied on in arriving at particular ratings, etc.; and (c) the continuous refinement of the competency assessment system itself on the basis of extensive quality assurance and use studies conducted at the end of each term. The specific activities and procedures employed in seeking to insure quality in competency measures are:

1. Provide a continuous program of inservice training for college supervisors in the content and use of the assessment system. This is done formally through at least one two-day retreat during each term, and informally through weekly staff meetings throughout each term. Formal training involves an intensive review of the system for purposes of refinement or elaboration; an application of the system to video-tapes of classroom teaching; systematic comparison of ratings given the performance viewed on video; and extended discussions to determine the reasons for any differences observed in ratings provided the performance viewed.

2. The preparation of school supervisors to use the system reliably. This is also done formally and informally. Formal preparation is provided for one supervisor from each school in which prospective teachers are placed through a one-week inservice workshop held on the OCE campus each summer, and through systematically scheduled meetings between college supervisors and school supervisors working within a particular building. Informal training occurs throughout a term through continuous contacts between college supervisors, the building supervisor for competency assessment and other supervisors working within a particular building. The formal training program offered in the week-long workshop on campus, and the formally scheduled meetings with building supervisors, follow the same pattern of training as outlined for college supervisors.

Table 2.
Substative Research To Be Pursued Within The Context Of The Elementary Teacher Education Program at OCE During the 1974-75 Academic Year

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POLICY ORIENTED STUDIES

Cost-Benefit Studies

On-Line Program Evaluation Studies
- the collection of program adjustment data
- the collection of program design data

PRACTICE ORIENTED STUDIES

Follow-Up Studies
- on first year graduates of the ETE program
- on drop-outs from the ETE program

On-Line Studies of Short Term Program Effects

Continuation of the Study on the Effectiveness of Student Teachers Prepared at OCE under Competency and Non-Competency Based Programs

BASIC RESEARCH STUDIES

Hypothesis Testing Studies
- predictors of teacher responsiveness to pupil needs and circumstances
- teacher responsiveness to pupil needs and circumstances as a predictor of teaching success

Hypothesis Generating Studies
- a search for correlates of competence
  - —mastery of knowledge and skills that pertain to teaching
  - —personal characteristics such as age, sex, academic ability and body type
  - —personality characteristics
  - —attitudinal characteristics
  - —background characteristics
  - —the characteristics of the setting in which teaching occurs
- studies of change
  - —in personality expressed in teaching
  - —in attitudes expressed in teaching
  - —in demonstrated teaching competence
- a search for correlates of change
  - —mastery of knowledge and skills that pertain to teaching as correlates of change in personality and attitude
  - —demonstrated teaching competence as a correlate of change in personality and attitude

THE OREGON COLLEGE OF EDUCATION—TEACHING RESEARCH DIVISION
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Table 3.
Methodological Studies to be Pursued Within the Context of
The Elementary Teacher Education Program at OCE During
The 1974-75 Academic Year

QUALITY ASSURANCE STUDIES

Form Use Studies

Indicator Use Studies

Rating Patterns and Distribution Studies

Inter-Rater Reliability Studies

DATA DISPLAY STUDIES

The Display of Quality Assurance Data

The Display of Competence Data

The Development of Procedures to Prepare and Display Cost-Benefit Data

INSTRUMENTATION STUDIES

The Refinement of Instruments
- Used in Assessing Teaching Competence
- Used in Assessing Attitudes Toward Self and Teaching
- Used in Assessing Learning Style and Cognitive Orientation
- Used in Assessing the Setting in Which Teaching Occurs

The Predictive Power of Competency Measures Obtained under Differing Conditions of Teaching

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3. All ratings from all supervisors are placed in computer storage immediately upon their completion.

4. When college supervisors complete ratings for ten students, they receive printouts of all ratings they have provided, with the printouts ordered in such a way that they can easily determine (a) the patterns that appear in their own ratings across different students; and (b) the agreements and disagreements between their ratings and ratings of school supervisors for the same students. All such "quality assurance checks" are reviewed by the evaluation staff prior to their distribution, and flagged where unusual patterns of ratings or noticeable disagreements occur between college and school supervisors in relation to the performance of a particular student. These

discrepancies are reviewed with the college supervisor and corrective steps explored if such seem needed.

5. At the end of each term a series of quality assurance studies are undertaken to determine assessment form usage; patterns in ratings provided by individual raters; patterns in ratings by college and school supervisors collectively; and patterns in ratings by schools. In addition, distributions of ratings for individual measures, as well as critical clusters of measures, are obtained; and inter-rater agreement studies, that is, studies of the agreement between college and school supervisors when rating a particular student teacher, are summarized. All such studies make heavy use of computer-based histogram and correlational analyses.[*]

6. Utilization of the data coming from the end of term and end of year quality assurance studies to refine the competency rating system, and to improve the inservice program designed to prepare people to use the system.

A number of exhibits are available to visitors to the program that explain and illustrate the quality assurance system that has just been outlined. Summaries of all quality assurance studies are made available at the conclusion of each academic year in the form of DATA BOOKS.

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[*] All such analyses are supervised by Dr. Peter Fontana, a physicist from Oregon State University who has been retained as a continuing consultant to the OCE-TR Center for competency based teacher education. Dr. Fontana has helped design all quality assurance studies, has done the computer programming that supports the studies, and oversees the analysis and interpretation of the data coming from the studies.

THE OREGON COLLEGE OF EDUCATION—TEACHING RESEARCH DIVISION PARADIGM FOR RESEARCH ON TEACHER PREPARATION

AREA OF COMPETENCE	ADAPT TO PUPIL & SETTING DIFFERENCES	APPLY WITH SENSITIVITY & CARE
Specify Desired Learning Outcomes and Indicators		
Prepare Activities and Materials		X
Carry Out Instruction		
Assess Learning Outcomes		
Display Outcome Data and Prescribe Next Steps		X
Perform Related Professional Responsibilities		

THE OCE MODEL OF AN EFFECTIVE TEACHER

AN ADDITIVE MODEL: The greater the competence in any given area, and the greater the number of areas in which competence is demonstrated, the greater the likelihood of success.

EXPERTISE DIMENSION

SUBJECT MATTER EXPERTISE

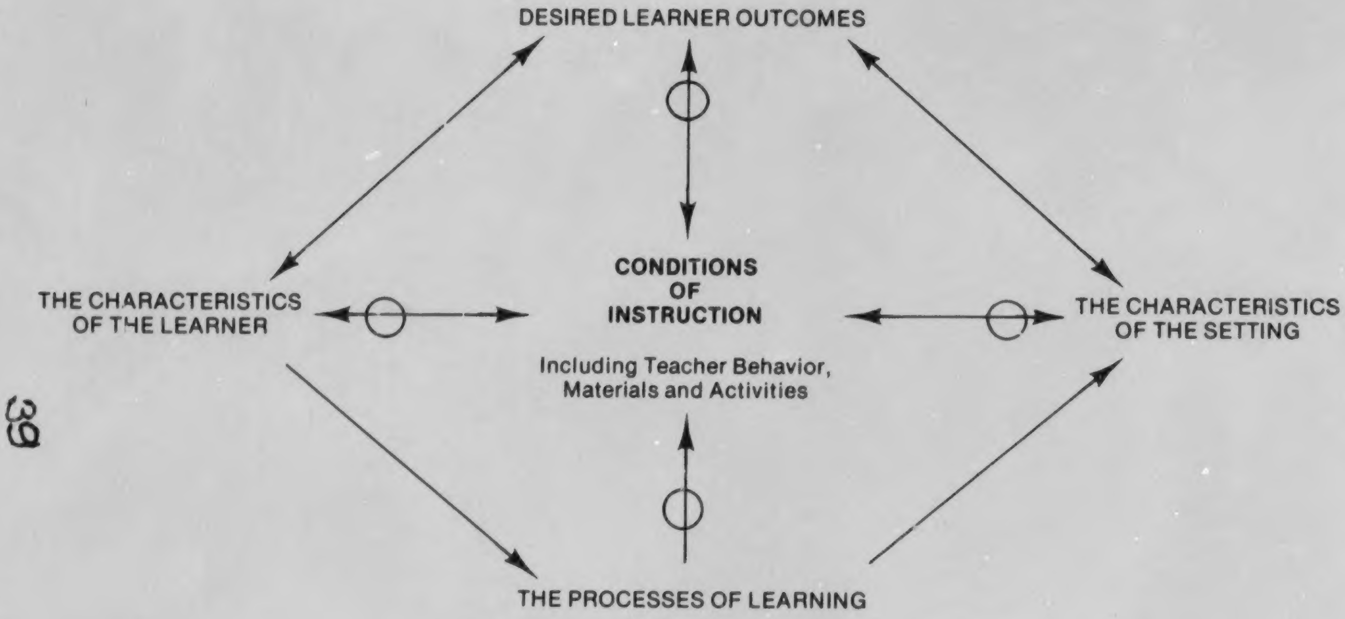
CHARISMATIC DIMENSION

				Low		High	
				Pedagogical Expertise		Pedagogical Expertise	
				LOW	HIGH	LOW	HIGH
Stimulation, Excitement	HIGH	Empathy, Concern	HIGH	4	3	2	1
			LOW	8	7	6	5
	LOW	Empathy, Concern	HIGH	12	11	10	9
			LOW	16	15	14	13

THE SPADY MODEL OF AN EFFECTIVE TEACHER

A CLASSIFACTORY MODEL: The closer a teacher's characteristics are to those represented in cell #1, the greater the likelihood of success as a teacher.

THE OREGON COLLEGE OF EDUCATION—TEACHING RESEARCH DIVISION PARADIGM FOR RESEARCH ON TEACHER PREPARATION


DESIRED LEARNER OUTCOMES
THE CHARACTERISTICS OF THE LEARNER
CONDITIONS OF INSTRUCTION
Including Teacher Behavior, Materials and Activities
THE CHARACTERISTICS OF THE SETTING
THE PROCESSES OF LEARNING

THE SCHALOCK MODEL OF THE VARIABLES INVOLVED IN INSTRUCTION

A PROCESS MODEL: The factors that a teacher must consider at any particular point in time in establishing effective conditions of instruction (the circles on the arrowed lines represent learner behavior and the squiggles represent the filtering effect of teacher characteristics on the perception of learner behavior and the other factors affecting learning).

A COMPUTER MANAGEMENT SYSTEM FOR PERFORMANCE BASED CURRICULUMS (COMSPEC)

Paul D. Gallagher

The Computer Management System for Performance-Based Curriculums (COMSPEC) developed at Florida International University is designed to manage student data and report this information to instructors, advisors, students and the administration in an efficient and effective manner. Generally, this report will focus on the various components of the system and the types of data that are collected, analyzed and used in the decision making process. The objectives of the system are as follows:

1. Establishment of a record for each student which includes his planned program of studies (course prescription) and his progress through courses in terms of modules, tasks and enablers which comprise each course (Program of Studies).

2. Reporting to instructors, on a weekly basis, the performance of students in their courses, the report indicating which enablers, tasks and modules were attempted and completed by each student. Weekly reporting on enabler data is optional, being included only at the request of the instructor (Student Progress Reports).

3. Establishment, by instructors, of certain criteria regarding individual student progress on tasks and modules which, if not met, should be reported to them so that they may respond more quickly to difficulties students may be having (Red Flag Report).

4. Establishment of a system for screening students for the student teaching experience (No Credit Exception List).

5. Development of a screening system to identify students eligible for graduation (Graduation Screening List).

6. Implementation of the Univac Interactive Language in a computer-based testing mode (On-Line Testing Facility).

7. Development of a faculty teaching productivity system to be utilized in decision making (Productivity Report).

The remainder of this report will describe each of the components of the system, what reports they provide and how they can be utilized.

PROGRAM OF STUDIES SYSTEM

The purpose of the Program of Studies is to provide an individualized, flexible system for auditing the course requirements of each degree-seeking undergraduate and graduate student. When used to its full potential, the system is both a degree plan and an accounting system. As a degree plan it contains the courses necessary to complete a specific degree; as an accounting system, it is the means by which a student and his/her advisor audits degree progress.

Information Contained in the Program of Studies Form

The Program of Studies Form is divided into five categories of information as indicated below. (Refer to Figure 1 for an example)

A. **TRANSFER AND/OR LIFEWORK CREDIT**—Transfer credit is that credit (received at another institution) which has been officially granted toward the specified teacher education program. Lifework credit is the credit that can be awarded by an academic unit for work experience gained prior to enrolling at the University.

B. **COMPLETED PROGRAM OF STUDIES COURSES**—The courses in this category represent those that have been designated as "Program of Studies" courses. Each course has been completed as evidenced by the number of credit hours, the grades and the quarter in which a student enrolled. The column labeled "Program of Studies" contains the intended quarter date in which the student planned to enroll in the course. If no date was indicated, three asterisks—***—will appear.

C. **FUTURE PROGRAM OF STUDIES COURSES**—Courses appearing in this category are required but have not yet been completed. These courses are Program of Studies courses as evidenced by an intended date to take the course or three asterisks—***—in the column labeled **Program of Studies.**

D. **PROGRAM OF STUDIES COURSES WITH NC GRADES**—Program of Studies designated courses for which NC grades were received appear in this category. Also, **WI**, and **NR** symbols will appear.

E. **COURSES NOT DESIGNATED PROGRAM OF STUDIES**—The courses in this category have been completed as evidenced by grades and credit hours; however, these courses have not been designated as Program of Studies.

Explanation of Program of Studies Calculations

The explanation of the calculations contained on the Program of Studies form is as follows: (See Illustration)

DEGREE HOURS REQUIRED: This figure is the minimum number of credit hours a student needs to complete his/her degree requirements.

NOTE: 180 credit hours is the **MINIMUM** requirement for an undergraduate degree. However, it is possible for students to need more than 180 credits to complete the requirements of their programs. When more than 180 credits are required, the additional number will be added to 180 if all course requirements are listed on the Program of Studies form. For example, when the **Program - S Hours Listed** is more than the **Program - S Hours Required**, the difference will be added to the **Degree Hours Required.** (This same procedure holds for both the 45 and 90 quarter hour master's degree.)

TRANSFER HOURS ACCEPTED: This number represents the total credit hours accepted by FIU toward the baccalaureate degree. This number includes transfer credits from other colleges and, if listed, Lifework credit.

PROGRAM - S HOURS REQUIRED: This number is the **difference** between **Degree Hours Required** and **Transfer Hours Accepted.** In effect, it is the amount of credit hours to be taken at FIU.

PROGRAM - S HOURS LISTED: This number is the total credit hours listed on the form for all courses **designated** as Program of Studies courses.

PROGRAM - S HOURS NEEDED: This number is the credit hours of course work which still must be listed (or designated) on the form as Program of Studies courses. This number is the difference between **Program - S Listed** and **Program - S Required.**

FIU DEGREE HOURS COMPLETED: This number is the total credit hours of course work listed under the category - **Completed Program of Studies Courses.**

NOTE: It **does not** include the credit hours listed under the category—**Courses Not Designated Program of Studies.**

DEGREE HOURS REMAINING: This number represents the credit hours that must be taken to complete the degree requirements. If no course work has been designated as Program of Studies this number would be the difference between the **Transfer Hours Accepted** and the **Degree Hours Required.** If no transfer credit has yet been granted and no course work listed (or designated) as Program of Studies, this number would be 180 for undergraduate students and 45 or 90 for graduate students.

Student Data on Program of Studies Form

Data	Location on Form
Student I.D.	Upper Left Corner
Student's School	Lower Left Corner
Student's Major	Lower Left Corner
Student's Entry Date (to FIU)	Lower Left Corner
Student's Name and Address	Lower Left Corner

PROCEDURE FOR DEVELOPING AND MAINTAINING PROGRAM OF STUDIES

Developing Program of Studies:

1. Student meets with academic advisor to discuss specific courses required for degree.

2. The courses decided upon are entered on the Individualized Program of Studies form and forwarded to the Office of Registration and Records.

3. The course data is keypunched and entered into the computer. The Individualized Program of Studies form is printed out during the first several weeks of each quarter for each student and forwarded to the appropriate academic units.

Maintaining Program of Studies:

1. Changes, deletions and/or additions to the Program of Studies should be made directly on the form.

2. Updating can be accomplished by the use of three codes in the column headed — **ACTION**

A = **ADD** a course to Program of Studies

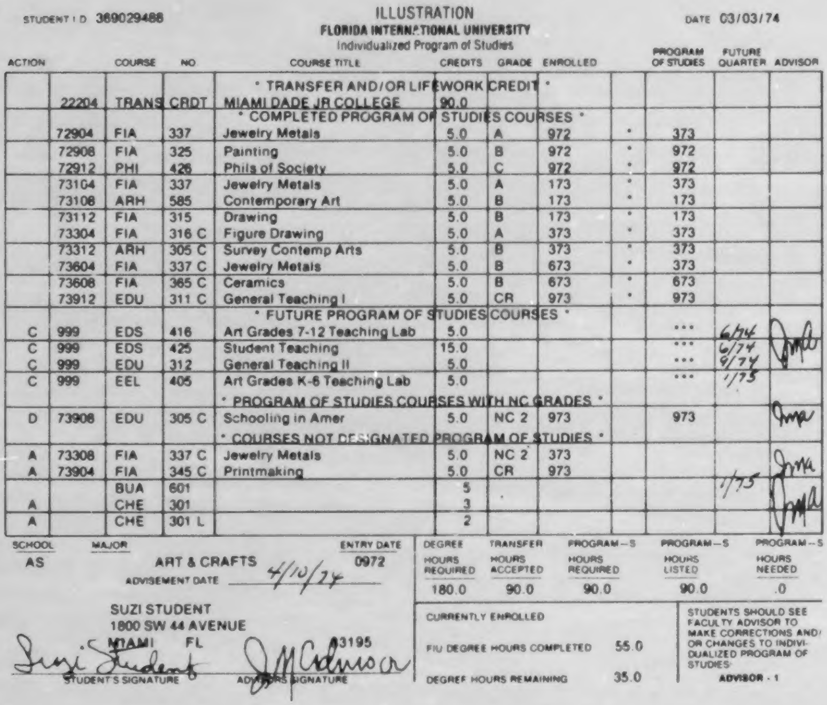
C = **CHANGE** future quarter of Program of Studies course
D = **DELETE** a course from Program of Studies

3. **Adding to Program of Studies**

   a) To **add** a course to the **Future Program of Studies** Courses category, enter an **A** in Action Column and course data on form (or attach appropriate pre-printed courses). (See Illustration)

   b) To move a course from the **Courses Not Designated Program of Studies** category to **Completed Program of Studies Courses** category, enter an **A** in the **Action Column.**

4. **Change in Program of Studies**
   The **C** code is utilized to change a future date for **Future Program of Studies Courses** category. To accomplish this transaction, enter **C** in



STUDENT I D 369029488

ILLUSTRATION
FLORIDA INTERNATIONAL UNIVERSITY
Individualized Program of Studies

DATE 03/03/74

ACTION		COURSE	NO	COURSE TITLE	CREDITS	GRADE	ENROLLED		PROGRAM OF STUDIES	FUTURE QUARTER	ADVISOR
				* TRANSFER AND/OR LIFEWORK CREDIT *							
	22204	TRANS	CRDT	MIAMI DADE JR COLLEGE	90.0						
				* COMPLETED PROGRAM OF STUDIES COURSES *							
	72904	FIA	337	Jewelry Metals	5.0	A	972	*	373		
	72908	FIA	325	Painting	5.0	B	972	*	972		
	72912	PHI	426	Phils of Society	5.0	C	972	*	972		
	73104	FIA	337	Jewelry Metals	5.0	A	173	*	373		
	73108	ARH	585	Contemporary Art	5.0	B	173	*	173		
	73112	FIA	315	Drawing	5.0	B	173	*	173		
	73304	FIA	316 C	Figure Drawing	5.0	A	373	*	373		
	73312	ARH	305 C	Survey Contemp Arts	5.0	B	373	*	373		
	73604	FIA	337 C	Jewelry Metals	5.0	B	673	*	373		
	73608	FIA	365 C	Ceramics	5.0	B	673	*	673		
	73912	EDU	311 C	General Teaching I	5.0	CR	973	*	973		
				* FUTURE PROGRAM OF STUDIES COURSES *							
C	999	EDS	416	Art Grades 7-12 Teaching Lab	5.0				...	6/74	
C	999	EDS	425	Student Teaching	15.0				...	6/74	
C	999	EDU	312	General Teaching II	5.0				...	9/74	
C	999	EEL	405	Art Grades K-6 Teaching Lab	5.0				...	1/75	
				* PROGRAM OF STUDIES COURSES WITH NC GRADES *							
D	73908	EDU	305 C	Schooling in Amer	5.0	NC 2	973		973		
				* COURSES NOT DESIGNATED PROGRAM OF STUDIES *							
A	73308	FIA	337 C	Jewelry Metals	5.0	NC 2	373				
A	73904	FIA	345 C	Printmaking	5.0	CR	973				
		BUA	601		5					1/75	
A		CHE	301		3						
A		CHE	301 L		2						

SCHOOL: AS
MAJOR: ART & CRAFTS
ENTRY DATE: 0972
ADVISEMENT DATE 4/10/74

DEGREE HOURS REQUIRED	TRANSFER HOURS ACCEPTED	PROGRAM—S HOURS REQUIRED	PROGRAM—S HOURS LISTED	PROGRAM—S HOURS NEEDED
180.0	90.0	90.0	90.0	.0

SUZI STUDENT
1800 SW 44 AVENUE
MIAMI FL 33195

Suzi Student
STUDENT'S SIGNATURE

J M Advisor
ADVISOR'S SIGNATURE

CURRENTLY ENROLLED
FIU DEGREE HOURS COMPLETED 55.0
DEGREE HOURS REMAINING 35.0

STUDENTS SHOULD SEE FACULTY ADVISOR TO MAKE CORRECTIONS AND/OR CHANGES TO INDIVIDUALIZED PROGRAM OF STUDIES

ADVISOR - 1

Figure 1
Sample Program of Studies (See next page for explanation)

EXPLANATION OF PROGRAM OF STUDIES [PGS] ILLUSTRATION

[Figure 1]

Line Numbers [Left Margin]	Explanation	Columns Requiring Updating					
		Action	**CRSE**	**No.**	**Credits**	**Future Qtr.**	**Advisor**
18, 19, 20, 21	The anticipated quarter of enrollment is indicated for EDS 416, EDS 425, EDU 312 and EEL 405 with the **C** code.	C				Anticipated Qtr.	Initial
24	EDU 305 was previously designated a PGS course. The **D** code **deletes** it from the PGS category.	D					Initial
28	FIA 345, currently NOT a PGS course, is **ADDED** to the **Completed Program of Studies Courses** category with an **A** code.	A					Initial
*31, 32	BUA 601, not listed initially as a PGS course, is **added** as a PGS course with an **A** code.	A	Crse Abrv	Crse No.	No. Credits	Anticipated Qtr.	Initial
*33, 34	Same as above except Future Quarter is Undetermined.	A	Crse Abrv	Crse No	No. Credits		Initial
*35, 36	Same as above except this is a Credit Lab. (**NOTE:** ''L'')	A	Crse Abrv	Crse Abrv Incl ''L''	No. Credits		Initial

*To facilitate data entry and accuracy 2 lines are provided for manual updates to the PGS system. It is recommended that **PRINTING** be used when updating on the Program of Studies Form.

Action Column and appropriate quarter date in column labeled **Future Quarter.** (See Illustration)

5. **Deleting a Course From Program of Studies**
To delete a course from any one of the following categories—**Completed Program of Studies Courses, Future Program of Studies Courses, Program of Studies With NC Grade**—adjacent to appropriate courses, enter a **D** in the Action column. (See Illustration)

System for Tracking Individual Progress (STIP)

The System for Tracking the Individual Progress of students was developed to aid professors in the monitoring and management of student module, task and enabler data. This section of the report will describe STIP, the input requirements and the various types of reports that are generated.

Input Requirements

A. Course Structure Table Input Form

The Course Structure Table Input Form is used by the system to build the Course Structure Table. One of these forms is to be filled out whenever a course has changed. Figure 2 shows that EDU 305 is composed of four (4) modules. The first module has two (2) tasks, each task having one (1) enabler. The second module has one (1) task with no enablers, while the third module has one (1) task with three (3) enablers. The fourth module has only one (1) task, no enablers.

B. Red Flag Input Form

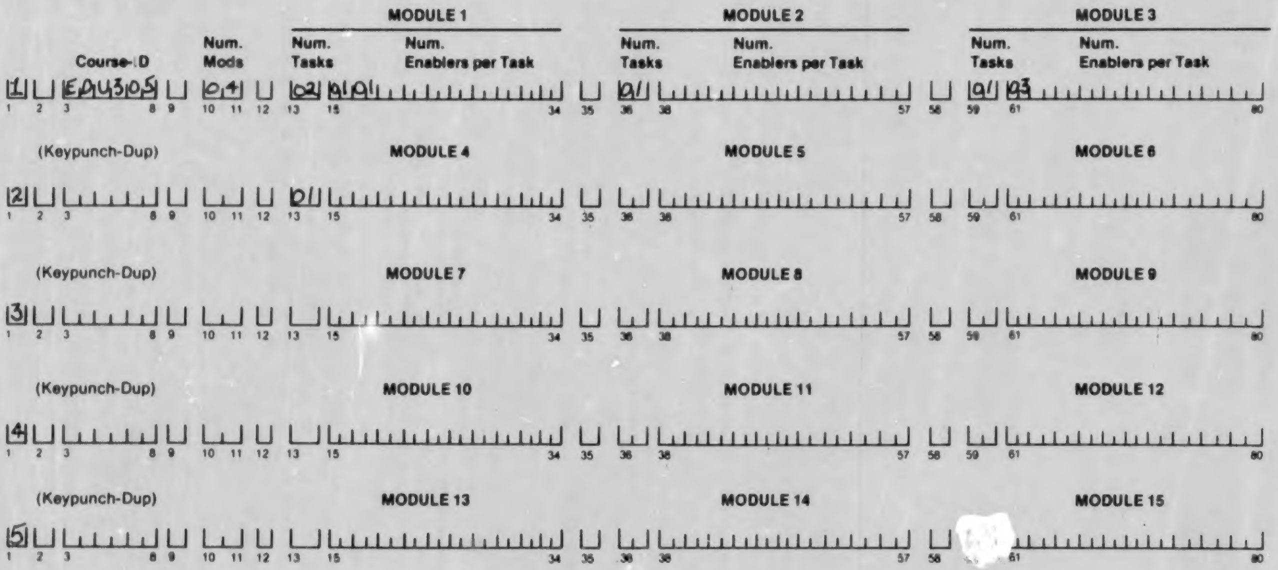
The Red Flag Input Form allows a professor to establish certain criteria regarding student progress which would indicate when a student may be having difficulties in the course. The current system design provides for red flagging a student on the basis of:

(1) time spent in a module
(2) time spent in a task
(3) the number of attempts at a task

Any student who violates the red flag criteria established by the professor will appear on the Red Flag Exception List.

In Figure 3, Professor John Smith (instructor code 005) has set a variety of conditions for the two courses he is teaching. The first entry will flag any student in EDU 305 if he takes longer than twenty-two days or makes more than two attempts on the first task of the first module.

COMSPEC COURSE STRUCTURE TABLE INPUT FORM



						MODULE 1			MODULE 2			MODULE 3	
		Course-ID		Num. Mods		Num. Tasks	Num. Enablers per Task		Num. Tasks	Num. Enablers per Task		Num. Tasks	Num. Enablers per Task
1		EDU305		04		02	0101		01			01	03
1	2	3 8	9	10 11	12	13	15 34	35	36	38 57	58	59	61 80
	(Keypunch-Dup)					MODULE 4			MODULE 5			MODULE 6	
2						01							
1	2	3 8	9	10 11	12	13	15 34	35	36	38 57	58	59	61 80
	(Keypunch-Dup)					MODULE 7			MODULE 8			MODULE 9	
3													
1	2	3 8	9	10 11	12	13	15 34	35	36	38 57	58	59	61 80
	(Keypunch-Dup)					MODULE 10			MODULE 11			MODULE 12	
4													
1	2	3 8	9	10 11	12	13	15 34	35	36	38 57	58	59	61 80
	(Keypunch-Dup)					MODULE 13			MODULE 14			MODULE 15	
5													
1	2	3 8	9	10 11	12	13	15 34	35	36	38 57	58	[illegible]	61 80

Figure 2

RED FLAG INPUT FORM

Fill in a line for each task or module you wish flagged in the Red Flag Exception List. When flagging a module, leave the TASK NO. and ATTEMPTS fields blank. When flagging a task, fill in MOD. NO., TASK NO., AND PERIOD and/or ATTEMPTS. When deleting a red flag condition established in a previous quarter put zeros in both the PERIOD and ATTEMPTS fields. Always fill in the COURSE ID and PROFESSOR CODE.

Course ID	Professor Code	Mod. No.	Task No.	Period*	Attempts‡
EDU305	005	01	01	22	2
1 6	7	10	12	14	16
EDU305	005	04		14	
1 6	7	10	12	14	16
EDU312	005	02	01		2
1 6	7	10	12	14	16
EDU312	005	03	02	17	
1 6	7	10	12	14	16
1 6	7	10	12	14	16
1 6	7	10	12	14	16
1 6	7	10	12	14	16
1 6	7	10	12	14	16
1 6	7	10	12	14	16
1 6	7	10	12	14	16

*Time period not to be exceeded, in days

‡The number of attempts on a task not to be exceeded

Figure 3

The second entry will flag a student who has taken longer than fourteen days to complete Module 4 of EDU 305. The last red flag entries are for another course Professor Smith is teaching, EDU 312. The first of these two entries will flag a student if he has made more than two attempts on Task 1 of Module 2. The last entry on the Red Flag Input Form will flag any student who has taken longer than seventeen days to complete Task 2 of Module 3 in EDU 312.

This form is completed whenever a professor is establishing red flag conditions or wants to change an existing red flag condition.

C. Task/Enabler Attempt Form

The Task/Enabler Attempt Form collects student progress data at the sub-course level. Each time a student attempts any task or enabler, this form is completed by the authorized assessor, whether he be a professor or a member of the Assessment Center staff.

Completed Task/Enabler Attempt Forms are picked up and turned in for keypunching. The keypunched record is then used for updating or, when necessary, creating each student's Type 3 and Type 4 Records. Each form allows for the reporting of three task and/or enabler attempts.

The following Task/Enabler Attempt Form (Figure 4) shows that Jane Doe, enrolled in EEL 306, Section 01, has completed Enabler 1 of Task 1 of Module 1 and Task 1 of Module 1. She has also failed to meet criteria for Enabler 2 of Task 2 of Module 2.

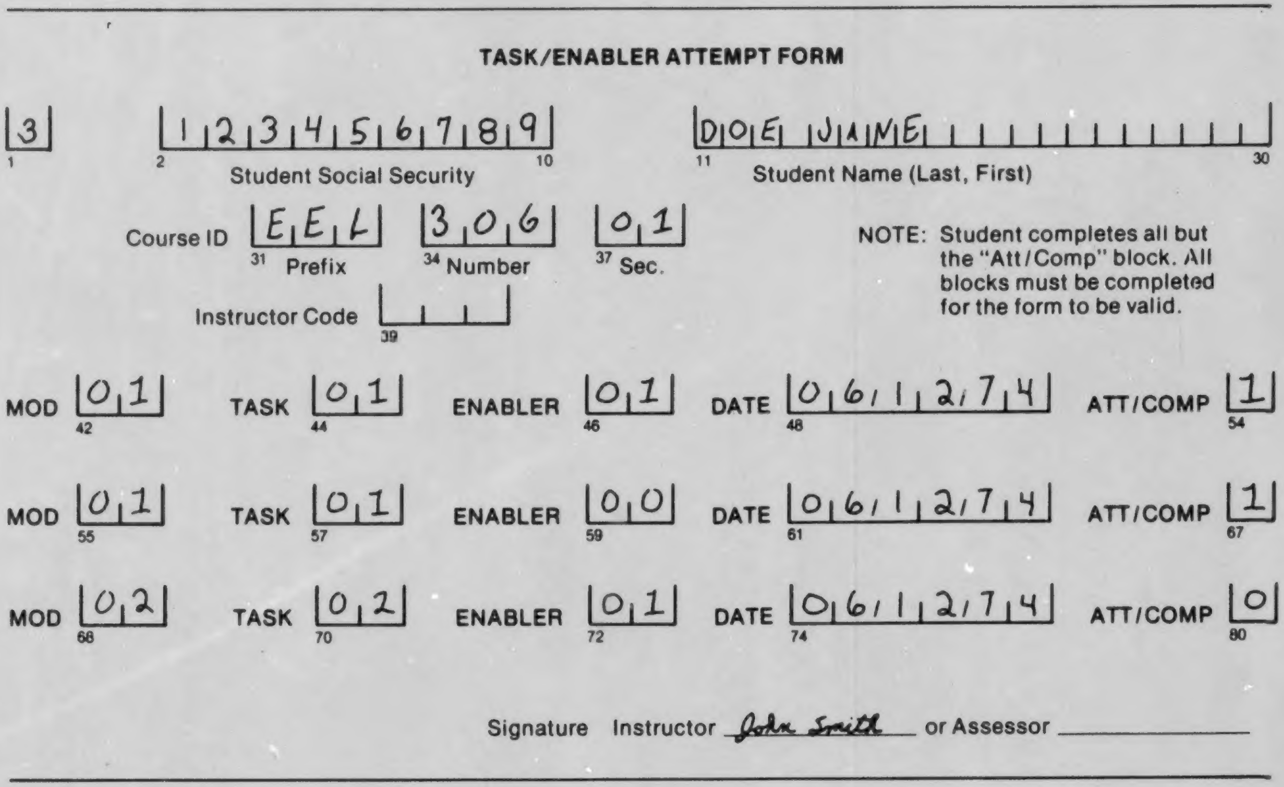
Output Reports

A. Student Progress Report

The Student Progress Report is produced weekly using the information collected by the Task/Enabler Attempt Forms. This report shows the professor the rate students are progressing through his course, showing which enablers, tasks and modules have been attempted and/or completed by each student.

The Student Progress Report has two formats. One format reflects progress at the task level (Figure 5), while the second format reflects progress through enablers (Figure 6). The format used will depend on whether or not a professor desires to collect enabler data.

Each report contains the course number, section and instructor name. All students enrolled in the course are listed by name and social security number which also serves as his/her student number. An



TASK/ENABLER ATTEMPT FORM

3 (1)

1 2 3 4 5 6 7 8 9 (2–10) Student Social Security

DOE JANE (11–30) Student Name (Last, First)

Course ID E E L (31) Prefix 3 0 6 (34) Number 0 1 (37) Sec.

Instructor Code (39)

NOTE: Student completes all but the "Att/Comp" block. All blocks must be completed for the form to be valid.

MOD	0 1 (42)	TASK	0 1 (44)	ENABLER	0 1 (46)	DATE	0 6 1 2 7 4 (48)	ATT/COMP	1 (54)
MOD	0 1 (55)	TASK	0 1 (57)	ENABLER	0 0 (59)	DATE	0 6 1 2 7 4 (61)	ATT/COMP	1 (67)
MOD	0 2 (68)	TASK	0 2 (70)	ENABLER	0 1 (72)	DATE	0 6 1 2 7 4 (74)	ATT/COMP	0 (80)

Signature Instructor John Smith or Assessor ______

Figure 4

asterisk (*) denotes completion of a particular task while a slash (/) indicates completion of a particular enabler.

A number under a task or enabler identification denotes the number of attempts which have been made by the student on the particular task or enabler. This number changes to an asterisk or slash upon successful completion of the task or enabler.

B. Red Flag Exception List

This report is a list of students who have violated the red flag conditions preset by the instructor on the Red Flag Input Form. The purpose of the list is to alert professors to a student having time and/or attempt problems in trying to complete a specific module or task. Figure 7 is an example of a Red Flag Exception List for EDU 305, Section 02.

C. Red Flag Report

A Red Flag Report (Figure 8) is produced for each professor who has established red flag criteria on particular tasks. The report, established from the Red Flag Input Form, serves as a record of all red flag conditions established by a professor. Any existing red flag conditions may be changed or deleted at any time by using the Red Flag Input Form.

Each report contains the course or courses for a particular

STUDENT PROGRESS REPORT

INSTRUCTOR: Roberts, Jason
COURSE: EDU 306 Section 08

DATE: 09/11/73
PAGE: 01

AN ASTERICK (*) DENOTES THAT A TASK HAS BEEN COMPLETED
A NUMBER INDICATES THE NUMBER OF ATTEMPTS MADE AT THAT TASK BY THE STUDENT

	MODULE	1	1	2	3	3	3	3	4	5	6	7
	TASK	1	2	1	1	2	3	4	1	1	1	1
STUDENT	SOC-SEC-NO											
Morris, Neal	123-34-4567											
Garrison, Henry	234-56-6789											
Lones, Molly	345-67-8901			*	*	*	*	*	*	*	*	*
Nuez, Otero	456-78-9012			*	*	*	*		*		*	
Perez, Quincy	567-89-0123			*	*	*	*	*	*	*	*	*
Evans, Farris	678-90-1234			*		*		*	*	*		
Vert, Wilson	789-01-2345				*	*	*					
Albert, Blue	890-12-3456			*	*	*		*	*	*		

Figure 5

STUDENT PROGRESS REPORT

```
INSTRUCTOR: Roberts, Jason                              DATE: 08/22/73
COURSE: EDU 306 Section 09                              PAGE: 01

AN ASTERICK (*) DENOTES THAT TASK HAS BEEN COMPLETED
A SLASH (/) DENOTES THAT AN ENABLER HAS BEEN COMPLETED
A NUMBER INDICATES THE NUMBER OF ATTEMPTS MADE AT THAT TASK OR ENABLER

                                  MODULE     1 2 2 3 4 4 5
                                  TASK       1 1 1 1 1 1 1
                                  ENABLER      1     1

STUDENT               SOC-SEC-NO
Johnson, Tuesday      123-45-6789                  * / * *
Isko, Wilson          234-56-7890                * * / * *
Basel, Judith         345-67-8901                  *     *
Tesy, Perry           456-78-9012                  * / * *
Rease, Robert         567-89-0123                * * /
678-90-1234           678-90-1234                  * /
Washington, Pauline   789-01-2345            *     * / * *
Harold, Henrietta     890-12-3456                  * /
Oppey, Terrance       901-23-4567                *   /
Harrison, Derald      012-34-5678                  2   * *
Ury, Theresa          098-76-5432                * *
Watero, Hally         987-65-4321                    /   *
Earls, Frederick      876-54-3210                *     * *
Green, Harold         765-43-2109                  2 /   *
Inter, Jason          654-32-1098            *         * *
Lones, Molly          543-21-0987                * *     *
Nunez, Ofero          432-10-9876                * * /
Perez, Quincy         321-09-8765            * / * *     *
Rasco, Sally          210-98-7654                *   / *
Tyson, Ury            109-87-6543                        *
Vert, Wilson          132-43-5432              /   * /
Albert, Blue          243-54-5432                *       *
Cutty, Derick         354-65-6543                * *     *
```

Figure 6

RED FLAG EXCEPTION LIST

INSTRUCTOR: Roberts, Jason DATE: 08/24/73
COURSE: EDU 30609 PAGE: 01

STUDENT	SOC-SEC-NO	MODULE	TASK	TIME PERIOD	TIMES ATTEMPTED
Earls, Frederick	123-45-6789	03	01	22 Days	2
Green, Harold	234-56-7890	04	01	14 Days	2
Rasco, Sally	345-67-8901	03	01	22 Days	2

Figure 7

instructor, the module and task numbers and the time and attempt criteria. Time criteria is set in number of days and attempt in number of student tries at a task. (See Figure 8.)

D. Course Completion Report

The Student Course Completion Report (Figure 9) provides the professor with a final status report for the quarter. The report includes the following:

a. A list of students who have completed all of the tasks, and therefore modules, for a particular course.

b. A list of the students who should receive a No Credit (NC) for not completing all of the work for the course. This list also indicates the status of the progress of this group of students who have not completed the required modules for the course.

RED FLAG REPORT

PROFESSOR: Roberts, Jason

DATE: 08/10/73
PAGE: 01

LISTED ARE THE RED FLAG CONDITIONS ESTABLISHED FOR YOUR COURSES.
PLEASE REVIEW THEM AND MAKE ANY NECESSARY ADDITIONS AND CHANGES FOR NEXT QUARTER ON THE RED FLAG INPUT FORM.
REVISIONS SHOULD BE IN BY 08/15/73.

COURSE ID	MODULE	TASK	TIME PERIOD	NO. OF ATTEMPTS
EDU 306	01	02	04	1
	02		07	
	03	01		2
	04			
	05	01	05	1
	05	02	03	1
	06	01		2
	07	03		
EDU 310	01	01	12	3
	02	01	07	2
	05	02		1
	06	03	15	2
EDU 313	03	01	10	1
	05	02	14	2

Figure 8

Figure 9 reveals that 16 students have completed all of the tasks for EDU 306 while another 13 are at various stages in the course.

```
                              COURSE ANALYSIS

INSTRUCTOR: Roberts, Jason                               PAGE: 01
COURSE: EDU 306 Section 09                               SPRING QUARTER 19

                       STUDENT COMPLETION DATA-TASKS

CREDIT STUDENTS: THE FOLLOWING STUDENTS HAVE COMPLETED ALL TASKS

Johnson, Tuesday
Isko, Wilson
Tesy, Perry
Basel, Judith
Rease, Robert
Pesad, Olsen
Washington, Pauline
Harold, Henrietta
Oppey, Terrance
Harrison, Derald
Ury, Theresa
Watero, Hally
Quesa, Mary
Levitz, John
Tyson, Peter
Horowitz, Emerson

NO CREDIT STUDENTS: THE FOLLOWING STUDENTS HAVE NOT COMPLETED ALL TASKS.
                    COMPLETED TASKS ARE MARKED BY *.

                    MODULE  1 2 3 4 5 6 7 8 9
                    TASK    1 2 1 1 1 1 1 1 1

Rodriguez, Elizabeth        * *   * * *
Bird, Cahtarine             * * * * * * * *
Saraso, Mark                * * * *
Wood, Deborah               * * *
Earls, Frederick            * *
Green, Harold               * * * * * * *
Inger, Jason                * * * * *
Lones, Molly
Perez, Quincy               * * * *
Rasco, Sally                * * * * * * * *
Tyson, Ury                  * * * * * * * *
Vert, Wilson                * * * * *
Cutty, Derick               * * *
```

Figure 9

E. Module Analysis (Figure 10)

The Module Analysis Report provides the professor module information that can be utilized in course management and revision. Additionally, this analysis can be used by the professor for research purposes. The report includes the following:

COURSE ANALYSIS

Page 2

INSTRUCTOR: Roberts, Jason
COURSE: EDU 306 Section 01

Spring Quarter 1973
Total Students • 32

MODULES

Mean Number of Modules Completed - 6.7

Mean Time to Completion	Mod 1	Mod 2	Mod 3	Mod 4	Mod 5	Mod 6	Mod 7	Mod 8	Mod 9
	22.7	10.4	6.3	6.1	5.6	7.4	6.4	4.2	3.4

Frequency Distribution of Time to Completion in Days

Days	Mod 1	Mod 2	Mod 3	Mod 4	Mod 5	Mod 6	Mod 7	Mod 8	Mod 9
0.1 - 1.	2	2	4	3	4	2	4	5	5
1.1 - 2.		1	2	2				1	2
2.1 - 3.		1	3	3	3	2	3	2	2
3.1 - 4.		1	2	3	4	4	3	5	5
4.1 - 5.		4	4	4	2	2	2	2	2
5.1 - 6.		2	2	1		1	1	3	
6.1 - 7.		2	1	3	8	3	5	1	2
7.1 - 8.	3					1		1	
8.1 - 9.	1	1	1	1					
9.1 - 10.	1		1	1	1	2	1		
10.1 - 11.		1	1	1					1
11.1 - 12.		3	1						
12.1 - 13.		1	2	2	1	1			
13.1 - 14.		1			1	2	2		
14.1 - 15.	2	1							
15.1 - 20.	4	2	1	2	1	1		1	
21.1 - 25.	7	1	1			1			
25.1 - 30.	1	1							
30.1 - up.	7	1					1		
TOTAL STDS COMPLETING MOD	28	26	26	26	25	22	22	21	19

NOTE: Each Computation is Based only on those students who completed the module (or task).

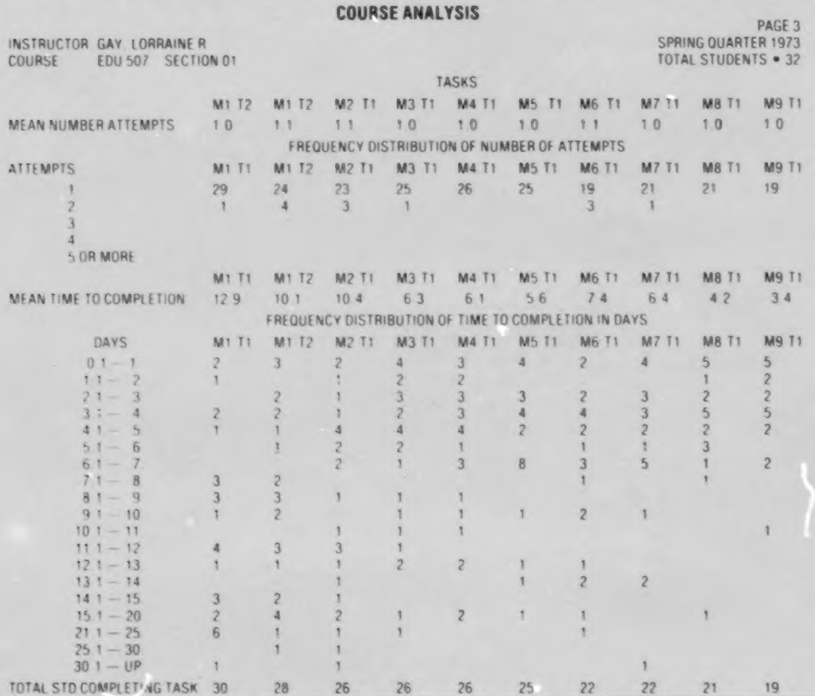
Figure 10

a. Mean number of modules completed.
b. Mean number of days to complete each module.
c. A frequency distribution of time, in days, that a given number of students required to complete the particular module.
d. Total number of students completing each module.

F. Task Analysis (Figure 11)

The Task Analysis Report provides the professor with task information that can be used in course management and revision. Additionally, this analysis can be used by the professor for research purposes. The report includes the following:

a. Mean number of attempts per task.
b. A frequency distribution of the number of attempts at each task.
c. Mean time, in days, to complete each task.



COURSE ANALYSIS

PAGE 3
INSTRUCTOR GAY, LORRAINE R — SPRING QUARTER 1973
COURSE EDU 507 SECTION 01 — TOTAL STUDENTS • 32

TASKS

	M1 T2	M1 T2	M2 T1	M3 T1	M4 T1	M5 T1	M6 T1	M7 T1	M8 T1	M9 T1
MEAN NUMBER ATTEMPTS	1.0	1.1	1.1	1.0	1.0	1.0	1.1	1.0	1.0	1.0
FREQUENCY DISTRIBUTION OF NUMBER OF ATTEMPTS										
ATTEMPTS	M1 T1	M1 T2	M2 T1	M3 T1	M4 T1	M5 T1	M6 T1	M7 T1	M8 T1	M9 T1
1	29	24	23	25	26	25	19	21	21	19
2	1	4	3	1			3	1		
3										
4										
5 OR MORE										
	M1 T1	M1 T2	M2 T1	M3 T1	M4 T1	M5 T1	M6 T1	M7 T1	M8 T1	M9 T1
MEAN TIME TO COMPLETION	12.9	10.1	10.4	6.3	6.1	5.6	7.4	6.4	4.2	3.4
FREQUENCY DISTRIBUTION OF TIME TO COMPLETION IN DAYS										
DAYS	M1 T1	M1 T2	M2 T1	M3 T1	M4 T1	M5 T1	M6 T1	M7 T1	M8 T1	M9 T1
0.1 — 1	2	3	2	4	3	4	2	4	5	5
1.1 — 2	1		1	2	2				1	2
2.1 — 3		2	1	3	3	3	2	3	2	2
3.1 — 4	2	2	1	2	3	4	4	3	5	5
4.1 — 5	1	1	4	4	4	2	2	2	2	2
5.1 — 6		1	2	2	1		1	1	3	
6.1 — 7			2	1	3	8	3	5	1	2
7.1 — 8	3	2					1		1	
8.1 — 9	3	3	1	1	1					
9.1 — 10	1	2		1	1	1	2	1		
10.1 — 11			1	1	1					1
11.1 — 12	4	3	3	1						
12.1 — 13	1	1	1	2	2	1	1			
13.1 — 14			1			1	2	2		
14.1 — 15	3	2	1							
15.1 — 20	2	4	2	1	2	1	1		1	
21.1 — 25	6	1	1	1			1			
25.1 — 30		1	1							
30.1 — UP	1		1					1		
TOTAL STD COMPLETING TASK	30	28	26	26	26	25	22	22	21	19

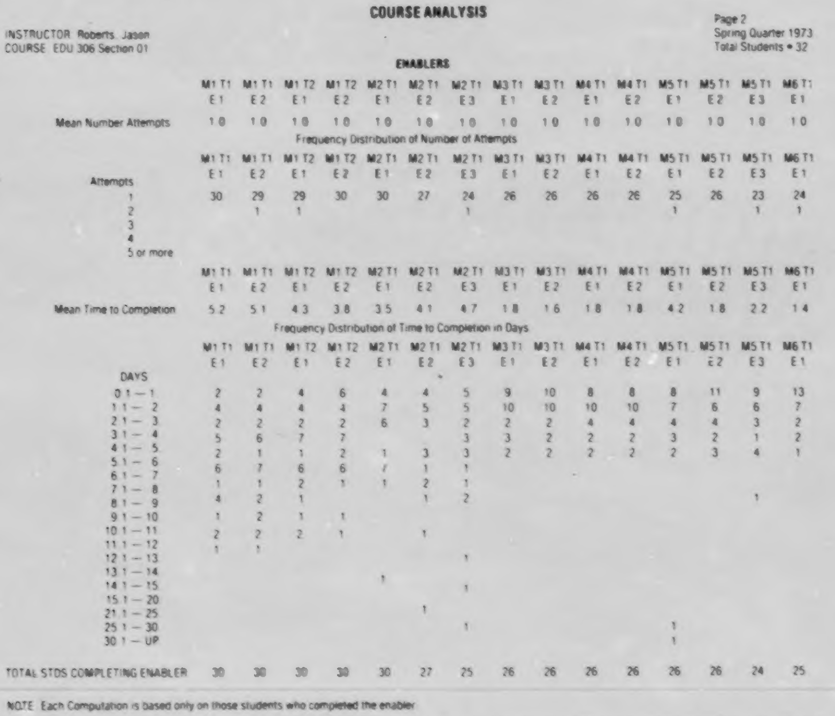
Figure 11

d. A frequency distribution of time, in days, spent on each task.
e. Total number of students completing each task.

G. Enabler Analysis (Figure 12)

The Enabler Analysis Report provides the professor with enabler information that can be used in course management and revision. Additionally, this analysis can be used by the professor for research purposes. The report includes the following:

a. Mean number of attempts per enabler.
b. A frequency distribution of the number of attempts per enabler.
c. Mean time, in days, to complete each enabler.
d. A frequency distribution of time, in days, spent on each enabler.
e. Total number of students completing each enabler.



COURSE ANALYSIS

INSTRUCTOR Roberts, Jason
COURSE EDU 306 Section 01

Page 2
Spring Quarter 1973
Total Students • 32

ENABLERS

	M1 T1 E1	M1 T1 E2	M1 T2 E1	M1 T2 E2	M2 T1 E1	M2 T1 E2	M2 T1 E3	M3 T1 E1	M3 T1 E2	M4 T1 E1	M4 T1 E2	M5 T1 E1	M5 T1 E2	M5 T1 E3	M6 T1 E1
Mean Number Attempts	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Frequency Distribution of Number of Attempts

Attempts	M1 T1 E1	M1 T1 E2	M1 T2 E1	M1 T2 E2	M2 T1 E1	M2 T1 E2	M2 T1 E3	M3 T1 E1	M3 T1 E2	M4 T1 E1	M4 T1 E2	M5 T1 E1	M5 T1 E2	M5 T1 E3	M6 T1 E1
1	30	29	29	30	30	27	24	26	26	26	26	25	26	23	24
2		1	1				1					1		1	1
3															
4															
5 or more															

	M1 T1 E1	M1 T1 E2	M1 T2 E1	M1 T2 E2	M2 T1 E1	M2 T1 E2	M2 T1 E3	M3 T1 E1	M3 T1 E2	M4 T1 E1	M4 T1 E2	M5 T1 E1	M5 T1 E2	M5 T1 E3	M6 T1 E1
Mean Time to Completion	5.2	5.1	4.3	3.8	3.5	4.1	4.7	1.8	1.6	1.8	1.8	4.2	1.8	2.2	1.4

Frequency Distribution of Time to Completion in Days

DAYS	M1 T1 E1	M1 T1 E2	M1 T2 E1	M1 T2 E2	M2 T1 E1	M2 T1 E2	M2 T1 E3	M3 T1 E1	M3 T1 E2	M4 T1 E1	M4 T1 E2	M5 T1 E1	M5 T1 E2	M5 T1 E3	M6 T1 E1
0.1 — 1	2	2	4	6	4	4	5	9	10	8	8	8	11	9	13
1.1 — 2	4	4	4	4	7	5	5	10	10	10	10	7	6	6	7
2.1 — 3	2	2	2	2	6	3	2	2	2	4	4	4	4	3	2
3.1 — 4	5	6	7	7			3	3	2	2	2	3	2	1	2
4.1 — 5	2	1	1	2	1	3	3	2	2	2	2	2	3	4	1
5.1 — 6	6	7	6	6	1	1	1								
6.1 — 7	1	1	2	1	1	2	1								
7.1 — 8															
8.1 — 9	4	2	1			1	2							1	
9.1 — 10	1	2	1	1											
10.1 — 11	2	2	2	1		1									
11.1 — 12	1	1													
12.1 — 13							1								
13.1 — 14					1										
14.1 — 15							1								
15.1 — 20															
21.1 — 25						1									
25.1 — 30							1					1			
30.1 — UP												1			
TOTAL STDS COMPLETING ENABLER	30	30	30	30	30	27	25	26	26	26	26	26	26	24	25

NOTE Each Computation is based only on those students who completed the enabler

Figure 12

NO CREDIT EXCEPTION LIST

One of the major problems of all Colleges of Education has to do with the initial screening of students who have applied for student teaching. It is imperative that they have received passing grades in all of their professional education courses before they are allowed to take on a student teaching assignment. Since checking each transcript by hand can be a long and tedious job, it was decided that a program should be developed to check student transcripts to determine whether they are carrying the appropriate grades to be permitted to student teach.

The No Credit Exception System is run on all students who apply for student teaching the quarter prior to the actual experience. The system prints a No Credit Exception List which is a printout of all applicants and the courses in which they are carrying MC grades (this could also be done for letter grades). Figure 13 gives an example of two students who have applied for student teaching but have several NC grades. For example, the first student (#042462974) has NC grades in seven different five quarter hour courses. This raises a red flag for the faculty advisor to have a conference with the student in order to determine what the problems might be and how they could be solved.

NO CREDIT EXCEPTION EXAMPLE

Soc. Sec. #	Cat. No.	Course ID	Sec.	Credit Hrs.	Grade	Course Title
042462974	72908A	EDU 305	C01	005	ONC1	Schooling in Amer.
042462974	73108A	HED 410	C01	005	ONC2	Drug Education
042462974	73112A	PHE 306	C01	005	ONC2	Scient. Found. PE II
042462974	73304A	EDU 312	C01	005	ONC3	Gen. Tch. Lab. II
042462974	73308A	PHE 307	C03	005	ONC2	Scient. Found. PE II
042462974	73312A	PHE 405	C01	005	ONC1	Spec. Tch. Lab
042462974	73604A	PHE 411	C01	005	ONC*	Theo. Prac. Phy. Act. I
043247120	73304A	FIA 337	C01	005	ONC1	Jewelry Metals
043247120	74104A	EDS 416	C01	005	ONC2	Spec. Tch. Lab. Art
043247120	74108A	EEL 405	C01	005	ONC2	Sp. Tch. Lab.: Art K-6
043247120	74303A	ARH 576	C01	005	ONC2	Modern Art
043247120	74304A	EDS 425	C01	015	ONC1	Student Teaching

Figure 13

GRADUATION SCREENING LIST

Each quarter, screening for graduation has necessitated a manual check across all divisions to determine if the criteria for graduation has been met. This is a complex and time consuming process which requires a major coordination effort among the faculty advisor, division chairman, the Dean's office and the Office of Registration and Records. To alleviate this situation, a graduation screening subsystem was developed. This system performs the necessary calculations and generates a graduation status report on all students who are within twenty-five quarter hours of the required number for graduation. This

```
                                   SCREENING REPORT
STUDENT ID       123456753                                               06/05/74

                            * TRANSFER AND LIFEWORK CREDIT *

TRANSCRDT        MIAMI DADE JR COLLEGE          90.0
TRANSCRDT        FLORIDA STATE UNIVERSITY       30.0
                         * COURSES COMPLETED REQUIRED BY MAJOR *

EDU     305      SCHOOLING IN AMER               5.0    CR              972     972
EDU     311      GENERAL TEACHING I              5.0    CR              173     173
EDU     312      GEN TCH LAB II                  5.0    CR              373     373
EEL     307      HEALTH & PE FOR CHILDREN        5.0    CR              973     973
EEL     318      EXPER ART IN THE ELEM SCH       5.0    CR              973     973
EEL     319      EXPER MUSIC IN THE ELEM SCH     5.0    CR              973     973
EEL     401      COMMUNICATION SKILLS I          5.0    CR              973     973

                          * OTHER COMPLETED COURSES AND NC-S *

FIA     325      PAINTING                        5.0    A               174     174
FIA     362      CERAMICS                        5.0    NC3             174     174

                     * COURSES NOT COMPLETED — REQUIRED BY MAJOR *

EEL     402      COMMUNICATION SKILLS II         5.0                    374     372
EEL     403      COMMUNICATION SKILLS III        5.0                    374     374

                          * FUTURE PROGRAM OF STUDIES COURSES *

EEL     425      STUDENT TEACHING               15.0                    674     674

ED802 ELEMENTARY ED         0972                                REQ
                                       REQ        OTHER       COURSES
SMITH JOHN                  TRANS    COURSES    COMPLETED       NOT        FUTURE
33 NE 45 ST                 CREDIT  COMPLETED    COURSES    COMPLETED     COURSES
MIAMI FL     33137          120.0     35.0         5.0         10.0         15.0
```

Figure 14

automated screening for graduation ensures much greater accuracy and consistency in checking the status of students. Figure 14 is an example of a screening report on an Elementary Education major. The report provides the following information:

a. Number of transfer hours
b. Required courses completed
c. No required course completed and/or course with No Credit grades
d. Required courses not completed
e. Future program of studies courses
f. Summary of credits of a-e above

On-Line Testing Facility

Another aspect of the overall system is the on-line testing component. This component uses the Univac Inter-active Language (IUL) instructional software system to provide lessons, assessment exercises, and tests.

Whereas the system can be used to present actual instructional lessons, the preliminary work completed at FIU uses it mainly as a testing facility. Multiple-choice, true-false, and short answer questions designed to evaluate specific enabling objectives have been coded in UIL and used in the assessment processes for certain modules. In taking the tests, the students are given immediate feedback on each item as well as on their overall performance on the enabler. Figure 15 presents the student flow in the UIL testing situation. Figure 16 presents an example of a segment of a test.

PRODUCTIVITY REPORT

In order for faculty resources to be efficiently and effectively allocated by an administrator in a University it is important that he/she have rapid and continuous access to faculty productivity data. Traditionally, this information has been gotten manually by having an individual sit at a calculator and determine the productivity for specific programs and individual faculty members within those programs. The management of this critical function has been slow and inefficient, to say the least. Therefore, after an analysis of types of mathematical computations that are carried out to produce a productivity ratio it was determined that the function could be much more readily conducted through the development of a subsystem of COMSPEC.

Basically, the productivity subsystem determines the productivity

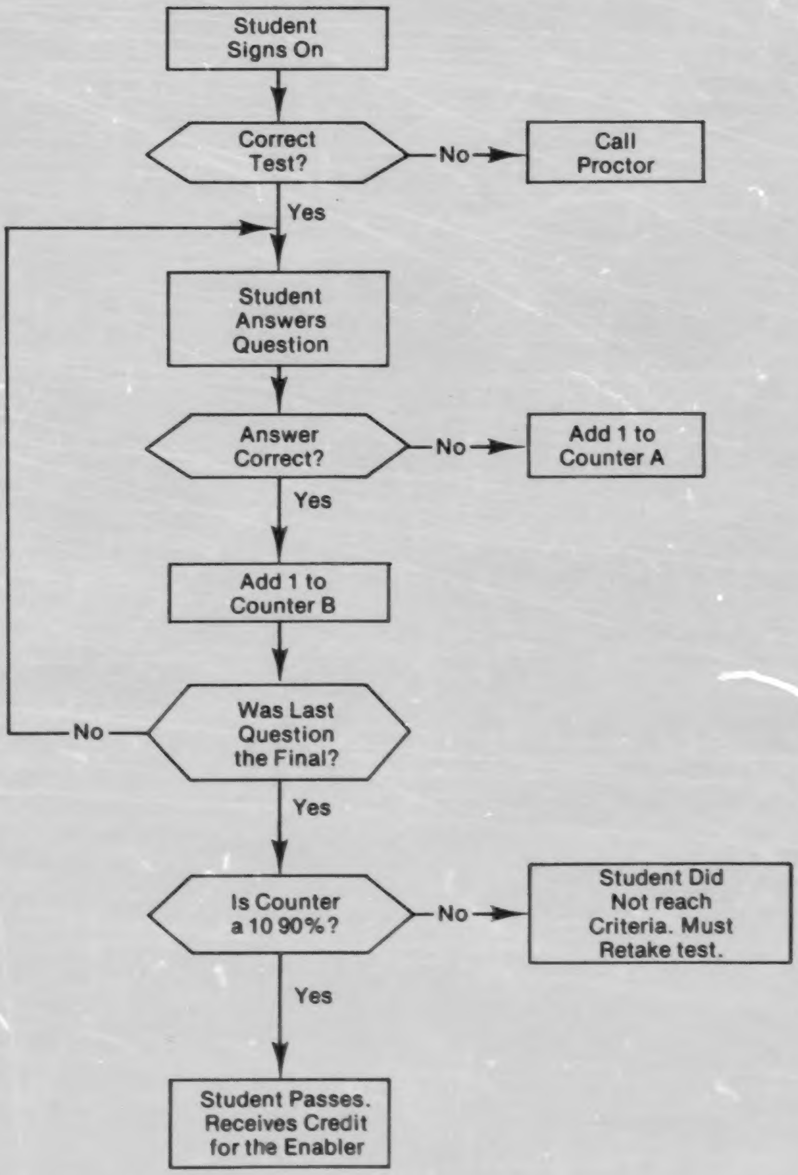

Student Signs On
Correct Test?
No
Call Proctor
Yes
Student Answers Question
Answer Correct?
No
Add 1 to Counter A
Yes
Add 1 to Counter B
Was Last Question the Final?
No
Yes
Is Counter a 10 90%?
No
Student Did Not reach Criteria. Must Retake test.
Yes
Student Passes. Receives Credit for the Enabler

Figure 15
Student flow in the UIL testing situation.
This example requires that the student have at least 90% correct.

```
UCS + ARPDGTEST•DUS16DISPLA
FRZ
  EDU 516 TEST 3—VISUALS //
  PLEASE CHECK TO BE SURE YOU HAVE THE CORRECT TEST./
  IF IT IS CORRECT, PUSH THE TRANSMIT KEY AND PROCEED WITH THE
    TEST.
  IF THIS IS NOT THE TEST YOU NEED, THEN TYPE OUT THE CODE OF IN
    AND PRESS THE TRANSMIT KEY. YOU WILL THEN BE OFF THE SCOPE
    AND ABLE TO CALL THE TEST YOU DO NEED.$$
  $$T=0$$
  $$DELAY, ERASE$$
FR4
    THIS TEST HAS BOTH MULTIPLE CHOICE AND FILL-IN-THE-THE-BLANK
        QUESTIONS.
        FOR MULTIPLE CHOICE ANSWERS JUST TYPE THE LETTER OF THE
        CORRECT ANSWER. SOME QUESTIONS REQUIRE MULTIPLE ANSWERS
        SO TYPE LETTERS OF ALL CORRECT RESPONSES./
        FOR THE FILL-IN-THE-BLANK QUESTIONS, TYPE OUT THE WORD(S)
        WHICH COMPLETES THE SENTENCE.
    LLT'S BEGIN $$
  $$DELAY, ERASE$$
FR6
  1. WHEN TEACHING GEOGRAPHY AND NEEDING AN ACCURATE MAP OF THE
    UNITED STATES DRAWN ON THE CHALK BOARD, THE MOST PRACTICAL
      DEVICE TO HELP STUDENTS PRODUCE ONE IS:
      A. A TEMPLATE
      B. A GRID
      C. A STENCIL
      D. A MAP TRANSPARENCY, PROJECTED$$
  D$$READ, DM, PRINT C, T=T+1, DELAY, ERASE, GO TO B$$
  $$PRINT W, DELAY, ERASE$$
C CORRECT$$
W INCORRECT.$$
FR8
  2. THE EASIEST WAY FOR MOST TEACHERS TO ENLARGE A LINE
      DRAWING FROM A BOOK, WITH ACCURACY, IS TO USE:
      A. THE /GRID/ METHOD
      B. FREEHAND SKETCHING
      C. OPAQUE PROJECTION
      D. TEMPLATES AND COMPASS$$
  C$$READ, DM, PRINT C, T=T+1, DELAY, ERASE, GO TO 10$$
  $$PRINT W, DELAY, ERASE$$
C CORRECT$$
W INCORRECT. LOOK BACK OVER THE QUESTION$$
FR10
  3. BULLETIN BOARDS AND OTHER DISPLAYS SHOULD BE DEVELOPED
      WITH FUNDAMENTALS OF GOOD DESIGN. FIVE OF THESE FUNDAMENTALS
      ARE:
      A. HARMONY, CONTRAST, BALANCE, EMPHASIS, SHAPE
      B. HARMONY, COLOR, SHAPE, EMPHASIS, CONTRAST
      C. HARMONY, SIZE, COLOR, CONTRAST, BALANCE
      D. HARMONY, SHAPE, BALANCE, CONTRAST, SIZE$$
  A$$READ, DM, PRINT C, DELAY, ERASE, T=T+1, GO TO /½$$
  $$PRINT W, DELAY, ERASE$$
C VERY GOOD $$
W INCORRECT. READ IT OVER AGAIN. $$
FR12
```

Figure 16

of each instructor, the productivity of the undergraduate programs and the productivity of the graduate programs of each division in the School of Education.

Figure 17 is an example of an instructor productivity chart for an undergraduate division in the School of Education. The individual faculty productivity is determined by multiplying the number of students being taught by the number of credit hours in the course(s) and then dividing the product by the total percent of a faculty member's load allocated to the teaching of those students. The example shows Professors Smith, Jones, Doe and Johnson respectively with productivities of 280, 1845, 805, and 375. The total overall productivity for this division is 826.25.

INSTRUCTOR PRODUCTIVITY CHART

for Undergraduate Division of the School of Education

Instructor Name	Course	Sec	# Stu	Hrs.	# Course	S.C.H.	Course Weight
SMITH	EDS408	1	23	5	2	115	.5000
SMITH	EDS420	1	33	5	2	165	.5000
Instructor Productivity, at course weight 1.0000, IS 280							
JONES	EEC425	4	123	15	2	1845	.5000
Instructor Productivity, at course weight .5000, is 1845							
DOE	EEL401	2	32	5	4	160	.2500
DOE	EEL411	1	129	5	4	645	.2500
Instructor Productivity, at Course weight .5000, is 805							
JOHNSON	HED425	1	25	15	5	375	.2000
Instructor Productivity, at course weight .2000, is 375							
				TOTAL PRODUCTIVITY		826.25	

Figure 17
Sample Productivity Table

SUMMARY

The overall purpose of this presentation was to provide an overview of the computer information management system developed at Florida International University. The system was designed to provide instructors, advisers, students, and the administration with the necessary data to enable them to make sound instructional and management decisions.

FIELD-BASED SUPPORT SYSTEMS FOR RESEARCH AND EVALUATION

Gilbert F. Shearron

The purpose of this paper is to present information on the development of field-based support systems for Competency Based Teacher Education (CBTE, sometimes referred to as Performance Based Teacher Education, PBTE). Because of the problems associated with the language and terminology of Competency Based Teacher Education research and evaluation we begin with a definition of some key terms.

Field-Based Support Systems. This refers to a group of schools and school districts which work closely with a college or university in a teacher training effort.

Research. In the context of this paper research refers to the systematic study of CBTE and the teaching-learning process.

Evaluation. The term evaluation refers to appraising the performance of individuals and programs.

Competency Based Teacher Education. CBTE is a process that involves the specification of expected outcomes (teaching competencies assumed to promote pupil behaviors and the demonstrated ability to promote pupil learning); the designing of learning activities that focus on helping students achieve expected outcomes; and finally, evaluation to determine whether or not the expected outcomes have been acquired; and, if not, why not.

Pupils. Pupils are individuals who are enrolled in school, grades nursery through twelve.

Students. Students are individuals enrolled in teacher education programs.

Competencies. A written statement of something a student should know or be able to do. For purposes of this paper, competencies will be limited to teaching skills a prospective teacher should be able to perform. Generally, a teaching competence would be some behavior directly associated with teaching pupils. It might be the teaching of an inquiry lesson or determining the instructional needs of a learner (diagnosis).

The paper is divided into two parts. Part I considers the theoretical aspects of a field-based support system. Part II describes attempts to develop field based support systems. The paper is limited to a discussion of support systems for preservice teacher education.

Our position is that the development of field-based support systems must take into account the entire use of the system and not only research and evaluation. Therefore, both parts I and II will consider the training function as well as the research and evaluation functions.

I

Some Theoretical Considerations

The field-based support system for CBTE can perhaps best be understood by considering three differences between CBTE and conventional teacher education efforts.

These differences are as follows:

1. A shift from an essentially data free to an essentially data dependent mode of operation. Evaluation of both student and program are required for decision-making involving programmatic changes and plans for individual students.

2. A shift from an essentially training function to a research, development and training function.

3. A shift from an essentially college or university centered program to a field-centered program. Significant portions of the CBTE program take place in the field. At some point, the demonstration of competencies and the promotion of pupil learning should take place in a school setting.[1]

The differences referred to above provide a frame of reference that gives some background for the requirements of a field-based support system. Conceptual models can be developed that include research training, and evaluation; but the shift to a field-centered program requires the development of a shared decision base with another institution. Shared decision-making adds a political dimension that can cause modification of conceptual efforts. In the establishment of field-based support systems, one must consider political realities or fail. Therefore, in conceptualizing a CBTE effort we need to consider a corresponding political strategy for its implementation.

Some Requirements of the Support System

The requirements for a field-based support system for CBTE come basically from its three components: training, research, and evaluation. The support system must deal with all three components as a totality, not as separate entities. Yet, each component has its individual purposes.

Let us consider for a moment some of the purposes of evaluation so that we may look at some of the requirements of a support system. One purpose of evaluation is to provide information to decision makers so that decisions can be made on whether a student has sufficient competence to be certified.[2] A second purpose is to provide decision makers with information on the effectiveness of the teacher education program. To support these purposes, the support system should provide the following:

1. Opportunities for students to demonstrate teaching competencies, and to attempt to promote pupil learning.

2. Opportunities to collect information on both students and program in a systematic manner.

Training CBTE students requires that they be given opportunities to practice teaching competencies assumed to promote pupil learning. It also requires opportunities for students to observe and engage in activities not necessarily related to demonstrating competencies or promoting pupil learning. Students need many opportunities to become familiar with pupils and their routines before practicing and demonstrating competencies.

The research needed to support assumptions underlying CBTE is not yet present. Any CBTE effort needs to consider research questions such as:

1. The relationship between teacher behavior and pupil learning.

2. The knowledge, attitudes, and teaching skills a teacher needs to have.

3. The adaptation of learning styles to learning activities.

4. The relationship between teaching styles and personality.

5. The relationship between expected outcomes and selection procedures.

The field-based support system should allow opportunities to do the five types of research called for above. Perhaps the major requirement here is a commitment to research activities.

How can we satisfy the requirements for evaluation, research, and training within a field-based support system in light of some of the realities present? These realities begin with an understanding of the basic mission of the school: the education of the pupils who attend. Pre-service teacher education is only one of several of the school's secondary missions. Because of its primary mission, the school cannot do such things as adjust its curriculum so that a student can teach an inquiry lesson in social studies on the third day of March. The school cannot let students from preservice teacher education programs arrive at their convenience to practice and demonstrate specified competencies.

Perhaps the most critical of the realities of developing a field-based support system is the question of the commitment of time by school personnel to a preservice teacher education program. There obviously must be joint planning between the schools and the teacher education institution. Planning requires time. The collection of data about student and program performance requires input from school personnel. This also requires time. The questions to be considered by those planning field based support systems are: What is the payoff for the school and its personnel? What are the trade-offs? How can learning opportunities for pupils be enhanced if a school is part of a support system for preservice teacher education?

Another element that needs consideration in developing the support system is the mission of the college or university teacher training institutions. The primary missions of most institutions of higher education are two or three-fold: the training of educational personnel, service to its constituents, and research. These three missions seem to be compatible with activities discussed above. However, higher education institutions must be willing to provide the resources necessary to operate a field-based support system. If university faculty are expected to spend time in the field, then faculty load time must be provided. Moreover, travel expense should be available, and rewards provided for faculty members who take part in field-based CBTE.

There are, then, within the theoretical aspects of a field-based support system many requirements to consider. But these requirements have to be tempered by the realities of the schools. It would be desirable to have a group of schools whose faculty and leaders were favorable to changing curricula, research, evaluation and field-based teacher education programs. However, even with this commitment there is still the overriding priority of the education of the school pupils.

II

Developing the Support System

The first part of the paper has presented theoretical considerations for establishing field-based support systems. We now consider attempts to develop a field based support system. Much of this section is drawn from the author's experiences at the University of Georgia. The position taken there was that the **total** support system must be considered.

Before development begins, several assumptions should be considered. These assumptions provide the ground rules by which one should attempt to play the game. The assumptions presented here are not offered for adoption but for consideration. An individual teacher education program needs to establish some assumptions that give direction to its development. If these assumptions are violated, then program developers have no set of guidelines on which to operate and make decisions. Some of these assumptions follow:

1. The major purpose of the schools within the field-based support system is the education of their pupils. Therefore, any teacher education program, with its research, evaluation, and training components, must enhance the learning activities of these pupils.

2. There must be a written agreement between the school district, institution of higher education, and the organization representing teachers that clearly delineates roles and responsibilities.

3. The institution of higher education must provide services and resources to the public schools as a "trade-off" for what the schools are providing the university.

4. The involvement of the university in "improving the program of the schools" should come only at the invitation of the schools.

5. Joint decision-making requires setting up a governance structure that actually operates so that all concerned can see the results of the decision-making. There is nothing as unsatisfactory as proclaiming joint decision-making and then not allowing it to happen.

Before the development of a field-based support system begins, attention needs to be given to the university personnel to be involved.

Human relations skills that allow university personnel to work and communicate effectively with a school staff are crucial. University personnel that are "all knowing" and ready to "save the world" probably will not be too effective.

Consideration also needs to be given to the personnel from the public schools. There are two ways to proceed. One says that school personnel involved must be jointly selected by the schools and the teacher training institution. A second position is that school personnel who want to work in the training program be allowed to do so. If this second course of action is followed, the higher education group must accept what is available and hope that those who need improvement will improve as the program progresses.

The Georgia Strategy

The development of a field-based support system at Georgia began with a single school and then extended gradually to its present thirteen schools. The initial thrust focused on the development of relationships between the university and the schools. Formal agreements can be concluded by the board of education of the local school districts and the administration of the teacher training institution, but these formal relationships become operational only at the level where students and faculty from the university and the staff of the schools operate on a daily basis. The strategy was to place a coordinator from the teacher education staff in each of the schools. It was the task of this coordinator to develop the relationships necessary to operate a successful system. The selection of the coordinator was done jointly by the school district and the university. The qualifications for a coordinator are:

1. Knowledge of public school programs as a result of experience as a teacher, principal, etc.

2. Human relations skills needed to work effectively with principals and the school staff as well as the university staff.

3. Knowledge of the university program, especially its instructional activities.

The coordinator holds faculty rank at the assistant professor level or above. He or she is responsible for coordination of all university activities within a school. There is one coordinator per school.

Initially, students were clustered together in groups of courses for a period of one quarter. The coordinator with a team of faculty members (e.g.: specialist in reading, physical education, etc.) was responsible for planning the students' program with a field experience. This was not in a CBTE context at first. It was merely an attempt to have students have a field experience and provide services to the schools as instructional aides. The notion of teacher aides was part of the "trade-off." That is, it gave the schools something they valued.

This initial step provided an opportunity to establish relationships so that long range activities could occur. The establishment of the support system came about through developing trust and understanding between the university and the public schools. There is probably no better way to establish trust and understanding than at the personal level. This is what the coordinator and his team had to do first. It took time to do this, sometimes a year or more. Once confidence was established, it was easier to move forward with some feeling of possible success.

Individuals developing field-based support systems must realize that each of the parties involved (student, school personnel, university staff) needs to see that their investment and energy will be rewarded. Each party must have an understanding and concern for the others. The climate must become supportive, not defensive. All parties must strive to make the relationship open and authentic. There needs to be an attitude of experimentalism so that all parties are open to new experiences.[3]

One of the major results of this initial thrust at Georgia was the trade-offs that began to happen on an informal basis. For example, a group of primary teachers in a low income area were having problems with pupil achievement in mathematics. The teachers requested help from the coordinator who made a math educator available. The math educator worked with the teachers developing a math program based on the use of concrete objects rather than the abstract problems associated with textbooks. Successful learning activities for pupils were increased and teachers felt that they have been helped with problems that they identified rather than being told that they were doing something wrong.

The second stage of the strategy was the development of CBTE teams to manage students within a CBTE program and to develop a mechanism for shared decision-making. Faculty and students are organized into teams of about 100. Each team is paired with two public schools. The team serves as a student's home base for the two years of his professional training. Being limited to two schools for a period of two years has some disadvantages for a student, but it provides many advantages in the development of a field-based support system. School personnel, students, and university faculty get to know each other well over this period of time. Each team has a governance committee that is charged with overall decision making for the team and its members. The governance committee is made up of students, school personnel and university staff.

Identifying and Assessing Competencies

The development of the CBTE effort usually begins with the identification of teaching competencies. This needs to be done jointly by school and university personnel. Competencies the need to be practiced and demonstrated cannot be a part of the field system if teachers in the field do not believe that they are appropriate. Competencies also need to be assessed. Therefore, the identification of competencies should include consideration for their assessment. Of course, one should also keep in mind that the promotion of pupil learning needs to be considered. Competency identification can also provide a framework for later research undertakings.

Perhaps the most expedient way to begin the identification and assessment of competencies is to consider what goes on in schools. In most school situations there is planning for instruction and implementation of the plans. Planning usually includes objectives for instruction, some type of instructional strategy, instructional materials to be employed, and some type of assessment of both students and the effectiveness of the lesson. Implied in the execution of a lesson plan are classroom management, discipline, control, and/or development of the learning environment. The carrying out of a planned lesson provides a framework in which it is possible to both practice and demonstrate competencies within the context of a school program.

It is probably not useful nor feasible to have students in a field center practice and demonstrate a specific competency out of context. For example, suppose a competency is in the area of questioning skills. You would question pupils within a learning activity. Another example would be in the area of diagnosis. Diagnosis may be done in simulated situations, but it finally must be considered within the context of a pupil being diagnosed, a learning activity prescribed, and the pupil being assessed in order to determine the accuracy of the diagnosis.

The school is usually willing to give students the opportunity to practice and to demonstrate competencies provided there is a connection between the desired competencies and the instructional program. Therefore, competency assessment should be considered in terms of the assessment of multiple competencies. Clustering competencies within the context of a single lesson plan or a continuing series of lessons, or perhaps units of work can be accomplished without serious problems. In general, competency clusters include: defining outcomes, diagnosing pupils on the basis of the desired outcomes, selecting learning activities based on the diagnosis, selecting learning materials, carrying out instruction, organizing the learning environment, and evaluating student growth. These functions can be carried out in either short or long term teaching assignments. They can be carried out working with groups of pupils or with a single pupil.[4]

The procedure described above will allow for assessment of the demonstration of teaching competencies and/or the promotion of pupil learning. Pupils could be pre- and post-tested to determine progress made within the teaching assignments of individual students. The requirements of an evaluation procedure for students can be met by these procedures.

The role of personnel in the support system must be defined in the evaluation of teaching competencies. Consider the role of the classroom teacher and other school personnel. Certainly, classroom teachers need to have the final say on what is to be taught. Therefore, they must review teaching plans in advance. Approval by school personnel will almost have to be a piece of the evaluation effort. Determination of the effectiveness of the teaching plan and the competencies being demonstrated probably should be the responsibility of more than one person. It would, however, be very difficult to leave out the classroom teacher since he or she is usually most knowledgeable about the variables at work in the learning situation. If one accepts the notion of the involvement of school personnel in the evaluation process, then evaluation procedures must be carried out in some reasonable time frame. It is unrealistic to expect that teachers can undergo extensive training in the use of highly sophisticated measurement devices. It is also unreasonable to ask teachers to spend long hours filling out forms for the evaluation system.

The Training Function

The training function of the field-based system provides opportunities for students to practice and demonstrate competencies. There should also be opportunities to become knowledgeable about pupils, school routines, and normal classroom procedures. The support system must develop a balance between what is good for teacher education students and what is good for the schools.

The training function of the support system at Georgia is organized into phases. In the first phase of the program students become involved in classrooms by performing noninstructional types of activities. These activities are not necessarily competencies to be developed, but tasks assumed to be activities that teachers are engaged in. An example of these kinds of tasks would be to have students assist six-year-olds with their coats when they are preparing to go home during cold weather or to assist the teacher in preparing materials for an art lesson. This type of activity accomplished several things. First, it gives opportunities for students to become knowledgeable about school routine. Second, it provides opportunities for students, teachers, and pupils to become acquainted. As a student begins to practice specific competencies later in his program, he will already know the pupils and the classroom situations. This affords him an opportunity to work in familiar surroundings. A third reason for this type of activity is that it provides a service (and a trade-off) to the staff and pupils of the school. This is part of an overall strategy to enhance learning experiences for pupils.

In other phases of the training effort students are providing services to the school while developing their own teaching skills. All of these activities and others are jointly planned by the governance committees referred to earlier.

Program Evaluation

This paper has pointed out that the support system needs to provide systematic information on the program. This means the evaluation of all facets of the program, how they operate, their success and failure. If students are not able to demonstrate certain competencies, where does the fault lie? Is it the fault of the knowledge acquired on campus or is it the fault of the field operation? Or, is the failure in some other part of the program? Field-based support systems must become part of this programatic evaluation. This means that there must be commitment on the part of the school faculty to put their program under close scrutiny and even to modify certain aspects of their efforts. Unless the schools feel that they are true partners in the ongoing teacher training program, they are not likely to agree to this kind of systematic evaluation.

Here, again, attention must be given to not burdening school personnel with unusual amounts of time-consuming paper work. In order to get accurate information, school personnel must value this type of activity and understand its purposes. Most school people as well as university personnel do not understand or see the need to gather systématic data about the effectiveness of programs.

Research

Research activities associated with teaching-learning can be initiated within the field-based support system with careful planning. Carefully designed studies within the general realities of schools can be undertaken if the proper climate has been developed. Part of any research efforts must include school personnel, at least at an informational level.

Summary

In summary, there seem to be several guidelines that will allow for the development of field-based support systems for research and evaluation.

1. The development of a support system requires consideration of all aspects of the system. Separate elements such as research and evaluation cannot be separated from the other elements.

2. A support system can be developed successfully if all parties involved are engaged in developmental as well as implementation efforts.

3. Roles need to be carefully defined and written down so that there is a clear understanding among all parties.

4. Research, evaluation, and training efforts must fit into ongoing school activities. Schools cannot modify their major purpose (the education of pupils).

5. The key factor in establishing a field-based support system is the trust and understanding that must be developed and nurtured by all parties.

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FROM ROCK THROUGH MELON TO MUSH:

The Place of the Teaching Center in Research and Evaluation

Sam J. Yarger

Research? Evaluation?

Any paper attempting to deal with the place of research and evaluation in an educational endeavor is usually obligated to first distinguish between those terms. Unfortunately, that distinction has created problems for this writer. The issue does not focus on whether or not there is a difference, but in this case whether or not that distinction is important vis-a-vis the performance of either activity in a teaching center. Before accepting the label of heretic, perhaps it would be wise to attempt an explanation.

Certainly there is no paucity of definitions concerning the word "research." Kerlinger (1964) says it as well as anyone: "Scientific research is systematic, controlled, empirical, and critical investigation of hypothetical propositions about the presumed relations among natural phenomena" (p. 13). He points out that the three key words in that definition are "systematic," "controlled," and "empirical." Others may say it differently, and are likely to relate the research endeavor to the generation of knowledge, the testing of theories, or the generation of hypotheses about theories; but, it is safe to assume that at least within the field of research, a high degree of consensus exists.

Evaluation, on the other hand, is generally viewed as an activity performed in order to make some determination or to fix some value about either a phenomenon or an object. It relates to examinations and judgments. Turner (1974) makes this distinction: "It avoids reliance on research findings or theory generated from research . . . The problem attacked is thus a practical one." Shalock (1974) makes a distinction between evaluation and assessment, with the latter being an upward extension of the former, ending in actual decision making. The key then, is that evaluation purports to place value, allow for judgments and finally to provide for the making of decisions on the basis of information rather than through capriciousness.

In reality, however, the words research and evaluation have been used to describe a multitude of activities, many of which bear little if any relationship to the above definitions. In some cases, "research" and/or "evaluation" departments collect little more than census data concerning a population or subpopulation. Often, these data are used to describe a school system along specific dimensions such as ages of students or percentage of families on welfare. It is not unusual to see school of education dissertations comparing one instructional process with another being presented as research. Infrequently does the "researcher" attempt to relate the findings of these comparisons to any type of theoretical or conceptual base. Finally, we find the word "research" used to describe experiments, the substance of which is linked, or attempts to be linked, with a specific theory of human behavior. Depending on the methodology employed, one could take the position that only the latter example would probably meet Kerlinger's definition. The first example would probably best be described as the simple acquisition of information, while the second is most likely an attempt to evaluate the relative effectiveness of two instructional processes.

To the field practitioner, neither research nor evaluation projects a good image. Where research is mystical and difficult to understand, evaluation usually means judgments of either good or bad, often related to one's professional livelihood. If there is a distinction that would make sense to the field practitioner, it probably lies in the concept of the usability of results. Research results may or may not be "usable," but in either case that's not their primary purpose. Evaluation results, however, purport to generate information that is in some way useful for something.

The fact remains that in general usage, the terms research and evaluation have become confused and the distinctions are very fuzzy. This may well be related to the lack of theory underlying most of the programming found in education. If, for comparative purposes, one were studying two different instructional approaches to reading, both research and evaluation might be involved, depending on the methodology employed, as well as the theoretical base underlying the study. On the other hand, if there was no theoretical base, and if the methodology did not relate to important questions, the study might not fit either the term research or evaluation. In either case, it is not within the scope of this paper to attempt to solve a problem that has plagued educationists for years.

Whether one is purporting to perform either research or evaluation, there is a common ground. Both activities are dependent on information or evidence, in order to reach a conclusion. For purposes of this paper, we define evidence as "something that offers proof." It is related to the questions asked in the research or evaluation strategy. The importance of the evidence will focus on such things as the modalities used to gather information, the variables that are accounted for as one gathers the information, and finally, the ways in which the evidence will be used.

Evidence comes in varying degrees of power. The powerfulness of the evidence dictates the inferential judgment that can be made as well as the degree of confidence one can have in that judgment. Sometimes, when no external pressures are evident, that inferential judgment can be made exclusively on the quality of the data. At other times, however, particularly when policy-making is involved, great pressures are brought to bear and frequently the inferential judgment is risky. Nonetheless, the validity of any inference made on the basis of evidence must be judged by the quality of the information. The remainder of this paper, then, will attempt to explicate a model for looking at the quality of evidence, determine the potential of the teaching center for the production of evidence, and discuss the strengths and weaknesses of that placement.

From Rock Through Melon to Mush

A scheme for the assessment of the quality of evidence is presented in Figure 1. In this model, three quality levels are presented, ranging

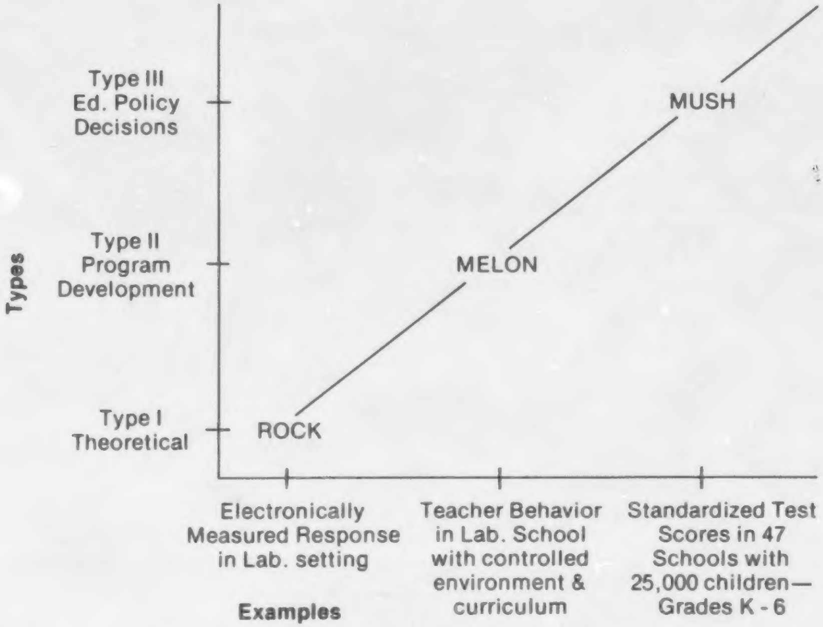
Types
Type III
Ed. Policy
Decisions
Type II
Program
Development
Type I
Theoretical
ROCK
MELON
MUSH
Electronically
Measured Response
in Lab. setting
Teacher Behavior
in Lab. School
with controlled
environment &
curriculum
Standardized Test
Scores in 47
Schools with
25,000 children—
Grades K - 6
Examples

Fig. 1 A Scheme for the Determination of the Absolute Quality of Evidence in Educational Research and Evaluation.

from the highly precise to the highly imprecise. It should be noted that no claim is being made for the absolute superiority of one quality level over another. Rather, each level of evidence must be judged by both the motivation for its procurement as well as its intended use.

Type I evidence, labeled **Theoretical,** is seen as highly precise, hence "hard as a rock." This type of data typically possesses the following characteristics:

- Generated from a methodology with limited scope;
- Variables are highly controlled;
- Related to a limited content area;
- Provides for small but certain inferential leaps;
- Often not of use to decision makers because of limited scope;
- Often has low field credibility because the problem appears insignificant.

Type I evidence is of the quality generally related to classical educational research. For many educational researchers it represents the "ideal," while for others it represents the only level of quality worth the pursuing. The important thing about Type I evidence is that in order to generate it, the researcher must have almost complete control over the experimental environment.

Type II evidence is of the quality usually generated by a competent researcher functioning in an environment over which control of many factors is not possible. Educators with a field orientation would consider it scholarly, though there is recognition of its shortcomings. It is labeled **Program Development** evidence because it is of the quality that educators frequently use to make substantive programmatic decisions. It does not possess the "hard-like-a-rock" quality, but rather is seen as more "soft like a melon." Type II evidence is characterized by:

- Less limited, more "practical" scope;
- Control over some variables, with recognition that others cannot be manipulated;
- Distinct methodological limitations vis-a-vis "good" research design;

- Higher credibility with field because of practical scope;
- Risky though not capricious inferences;
- Although usable to the field, probably of too limited a scope for policy makers.

If Type I evidence is generated by researchers in laboratory settings, Type II evidence is generated by researchers in educational settings. Frequently it suffers in status because it is judged by the "true" researcher to be too uncontrolled, while policy makers often view it as being too rigid and inflexible. However, it probably indicates the best efforts of conscientious practitioners in the real life world of education.

Type III evidence is usually generated by methodologies that attempt to solicit information from large populations in an effort to make reasonable policy decisions. It is thus labeled **Educational Policy Decision** evidence and must be viewed as possessing high degrees of imprecision, hence, "soft as mush." Type III evidence can be described by the following characteristics:

- Attempts to deal with problems of large scope;
- Must be generated with many uncontrolled and unperceived variables;
- Provides information that is easily understood and thus popular to the public;
- Possesses many methodological weaknesses;
- Provides for only the most risky inferential judgments;
- Preferred by policy makers because it is easily understood;
- Has little credibility with either field practitioners or educational researchers.

Regardless of the suspicion with which the educational community views Type III evidence, it will probably persist as the currency of exchange for many educational policy decisions. This writer would argue that it does have a legitimate place in the informational matrix, and the role of the educational community is to help policy makers understand the risk of rendering decisions based on this quality of evidence. Additionally, the educational community would probably benefit from efforts to improve the quality of Type III evidence, while keeping clearly in mind its intended uses.

It probably doesn't help the practitioner in education to view the three types of evidence as totally discrete. Rather, it would be more productive to view them on a single continuum, thus allowing for one to examine the relationship between the three evidenciary types. Figure 2 graphically presents this relationship.

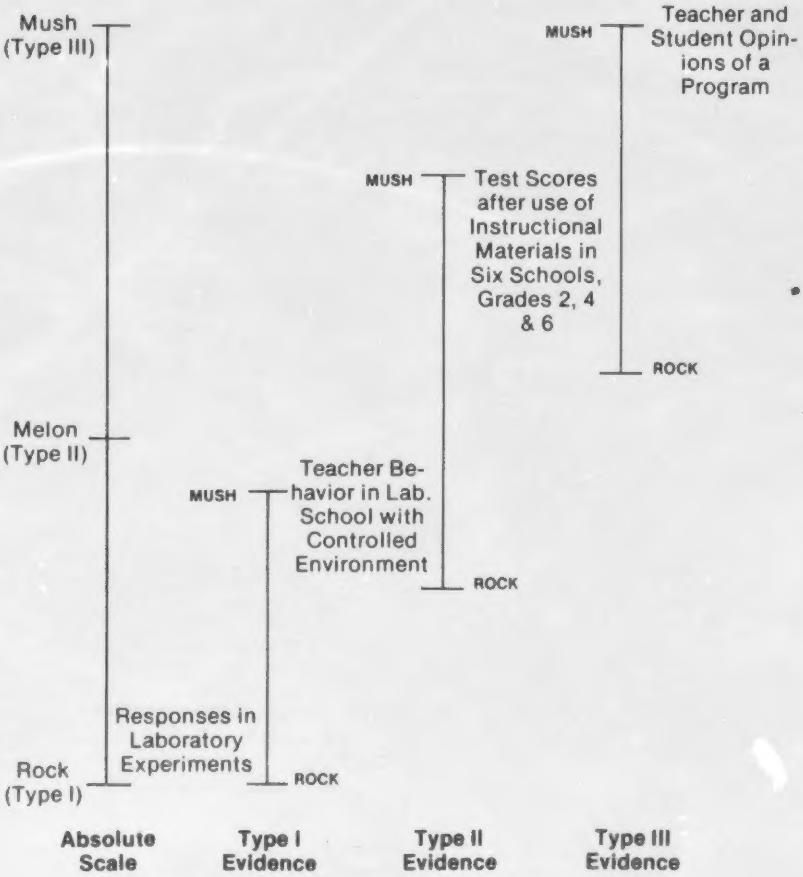
Mush (Type III)
Melon (Type II)
Rock (Type I)
MUSH
Teacher and Student Opinions of a Program
ROCK
MUSH
Test Scores after use of Instructional Materials in Six Schools, Grades 2, 4 & 6
ROCK
MUSH
Teacher Behavior in Lab. School with Controlled Environment
ROCK
Responses in Laboratory Experiments
Absolute Scale
Type I Evidence
Type II Evidence
Type III Evidence

Fig. 2 A Scheme for the Determination of the Relational Quality of Evidence in Educational Research and Evaluation.

Simply stated, one can envision an overlap in the extremes of the three types. For example, an experiment which measured physiological responses and attempted to relate them to differing emotional states would probably generate "rock" evidence, even within Type I. However, suppose an educational researcher was working in a laboratory school, where the students and the teachers were carefully selected and the curriculum was carefully controlled. Within this context, an attempt to compare the efficacy of two instructional strategies might well produce evidence that would be considered "mushy" on the Type I scale, but "hard-as-rock" on the Type II continuum. Finally, if a practitioner working within a school system sent out a questionnaire to all teachers requesting their perceptions of a given program, it would most likely produce "mush" evidence, even on the Type III continuum.

The relationship, then, is similar to a corruption of an old saying—"one man's rock is another man's mush." Although the emphasis must always be on maximum quality of evidence in relation to its intended use, it would be as inappropriate for a university-based researcher to look down his nose at Type II or Type III evidence, as it would be for a public school administrator to make fun of well-designed Type I endeavors. All evidence gathering strategies must be judged by how well they answer the question, "Am I obtaining the best possible information to deal with the problem I'm attempting to solve?" The issue becomes one of minimizing the constraints when gathering usable information, while maximizing the inferences which can be made from that information. It is an issue which has been and will continue to be at the heart of much of the debate concerning research and evaluation in education.

By attempting to develop the relational quality of evidence, the credibility of all three types can be established. Few educators would dispute the credibility and necessity of obtaining either Type I or Type II evidence. However, because Type III evidence is likely to be less popular with educators at all levels, perhaps some discussion is necessary.

Regardless of what some educators may think, those charged with making policy decisions in education would prefer to make those decisions based on solid documentation. Unfortunately, the broadness of the questions raised in policy decisions, along with the scope of the issues, frequently presents problems that go far beyond the skills of contemporary educational evaluation and research. At the same time, these questions do exist and they do demand a response. Interestingly, an argument can be built that the questions typically responded to with Type III evidence are those that simply cannot be dodged, while the questions responded to with Type I and II evidence are those which are less demanding of answers. Perhaps we would make more progress in education if theoretical and program development issues were considered with the same degree of urgency as are policy issues. If one accepts the premise that policy issues must be dealt with, then the obvious strategy for educators is to strive toward the development of higher order Type III evidence. Conceivably, educators could buttress their contentions by attempting to show relationships between high order Type III evidence and Type II, program development evidence. It is the contention of this writer that policy makers would welcome more substantive information to support decisions that must be made. For example, suppose a school system's mathematical achievement test scores have continually dropped over a period of many years, necessitating a policy decision in the area of mathematics programming. If educators could demonstrate (using Type II evidence) the efficacy of one approach to the instruction of mathematics over another, or perhaps even the differential efficacy of both, policy decisions could be made with greater competence than has existed in the past. Obviously, the issue here is one of communication and willingness to cooperate, an issue that desperately needs attention in the educational endeavor. The fact remains that without the leadership of informed educators and educational researchers, policy decisions at the local level, as well as state and national levels, will continue to be made on the basis of inadequate information. The tragedy of this situation is that those making important decisions are unaware of the riskiness of their judgments, while those who are aware are unwilling to put forth the effort to improve quality of decision making.

Rarely Rock, Usually Melon, Sometimes Mush

The logical question then becomes, where does the teaching center fit into this model of the quality of evidence? Before attempting to present the relationship, we must focus on the definition of a teaching center. Schmieder and Yarger (1974) defined a teaching center as:

> *a place, in situ, or in changing locations, which develops programs for the training and improvement of educational personnel [inservice teachers, preservice teachers, administrators, paraprofessionals, college teachers, etc.] in which the participating personnel have an opportunity to share successes, to utilize a wide range of education resources, and to receive training specifically related to their most pressing teaching problems.* (p. 6)

If there is a benchmark for teaching centers, it is the continuing focus on the development and enhancement of skills for the instruction of children, rather than the provision of many other valuable services such as computer scheduling, management of audiovisual programs, "payrolling," and supervision of lunch programs.

There are, of course, many different types of teacher centers across the country. Yet there appears to be at least a few common attributes prevalent in most. These include:

- Field-based, with "real" children;
- Clients are active preservice or inservice teachers;
- Program focus on "actual" rather than "ideal."
- More structured instructional and feedback systems than found in conventional inservice programs.

Before an attempt is made to relate teaching centers with their potential for generating evidence, a small disclaimer is appropriate. Because of the great diversity in teaching center activities throughout the country, exceptions to the general principle will exist. Consequently, the concept explicated here is not to be viewed as "set in concrete," but rather as a general principle.

Figure 3 graphically represents the place of the teaching center in regard to its ability to be a source of evidence. Typically, the teaching center will not be an appropriate environment for strategies designed to generate Type I evidence. The demands on the subjects (teachers, administrators and students) will usually be viewed as far too imposing for the ongoing program. It is doubtful whether it would be worth the time and effort of researchers to attempt to build the relationships and develop the necessary rationale designed to solicit the quality of support needed for a Type I strategy. Many would argue, and this writer would agree, that the focus in the teaching center is and must be the ongoing program for the instruction of children, rather than the generation of information which may or may not be helpful. The complex methodology required by Type I procedures, in conjunction with the need for highly controlled variables will typically render the scope of the strategy far too limited for the field to view as worthwhile. No attempt is made to negate the legitimacy of strategies designed to generate Type I evidence, but rather, the rationale here is that the teaching center is probably not the appropriate place to do it.

The teaching center is also an inappropriate environment for the

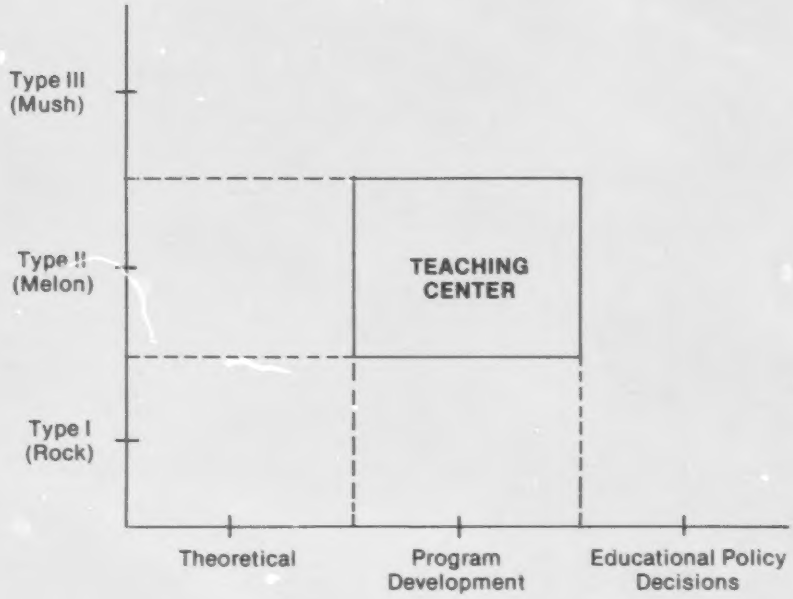

Fig. 3

An Estimate of the Appropriateness of the Teaching Center Environment for the Generation of Evidence.

implementation of strategies designed to generate Type III data. This is not likely to cause the conflict that a center's reluctance to provide Type I data might create, as Type III evidence tends to be frowned upon by the educational community in general. Typically, strategies designed to generate Type III evidence utilize opinion questionnaires, commercial standardized tests, rating scales and the like. Furthermore, these tools are usually administered with little concern for who responds to them and why, i.e., limited research design and/or conceptual base. It should be noted that used in a different context, these instruments could generate evidence of a more sophisticated quality. The issue for the teaching center will frequently be, how does one control the generation of Type III evidence, and how does one have some input concerning its use? "Mushy" information seems to ooze from the seams of educational institutions, subject only to the most rudimentary of control.

By now, it is obvious to the reader that this writer promotes the teaching center as an appropriate environment for strategies designed to generate Type II, or program development evidence. There are many reasons for this match. First, the scope of the strategy designed to elicit program development evidence is usually general enough to be appealing to teachers, while controlled enough to have some credibility with researchers. Also, there is a "real world" orientation, with a clear recognition that many variables cannot be controlled. In working with doctoral students in a teaching center environment, it has been this writer's experience that one usually initiates a project with hopes of controlling more variables than is ultimately feasible. Within this context, trade-offs are made grudgingly, often using a process of negotiation with field personnel who are involved.

In light of the fact that typically there is a focus on systematic program development as well as useful feedback mechanisms in a teaching center, Type II evidence can frequently be used not only by the researcher, but also by the center. One must always recognize that teachers as well as students put forth varying degrees of effort in order to be associated with a research or evaluation strategy. When the researcher can offer feedback viewed as helpful to the subjects, the credibility of both the researcher and the practice of research is enhanced. For this reason, if for no other, the teaching center can be viewed as an ideal environment for Type II strategies.

Because the researcher is more intimately involved with the ongoing program, control over the use of results can usually be exercised. Thus, this is one of the rare instances where the researcher can have some control over the inferences and judgments that are made by virtue of the information he or she has generated. Consequently, sensitive practitioners can use this phenomenon to sensitize field personnel to the need for continuing research and evaluation projects.

Lest it appear that the writer is promoting the marriage of teaching centers and program development research and evaluation as being made in heaven, one must be cognizant of the problems to be encountered. First, strategies designed to generate this quality of evidence in a teaching center will probably be more time consuming and demand more interpersonal skills on the part of the researcher than will either Type I or Type III strategies. Frequently, there will be a need for continuing negotiation and use of positive reinforcement in order to ensure the cooperation of field personnel. Finally, as stated earlier, trade-offs will have to be made. Schedules will need changing, subjects will be lost, and it will not be unusual for that final data-gathering session (the post-measurement of the dependent variable) to be viewed as unnecessary and a waste of time. Certainly, the patience of the researcher will be tested. Nonetheless, the teaching center can provide a viable environment for the collection of desperately needed data concerning the behavior of both teachers and children.

Sweet and Sour Melon

The place of the teaching center in the area of research and evaluation in teacher education needs a clear perspective if it is to deliver on the promise that it holds. On the "sweet" or positive side of the ledger, the teaching center provides a real world setting with unlimited opportunity for variation. Not only are there honest-to-goodness children available to a teaching center, but generally one will also find a number of both preservice and inservice teachers for use as subjects. In most cases, the teaching center will provide a climate that is more receptive to the gathering of information as well as the reception of feedback. If the teaching center has a governance board (and many do) this will offer the researcher the opportunity to develop not only an understanding, but also an acceptance of tasks he or she is trying to perform. As a result, this should not only create credibility with field practitioners but also develop some political acceptability with a wide range of constituents. Finally, even when one considers the trade-offs and time involved, the opportunity for a more beneficial cost/time factor is clearly evident. This benefit can be placed in better perspective when one considers the investment in time and energy traditionally given to developing and implementing a research or evaluation project in a conventional public school setting.

There are, however, distinct limitations inherent in the teaching center vis-a-vis the utilization of strategies for generating information. On the "sour" side of the ledger, it is simply not a good setting for well controlled experimental studies. Potter (1974) takes the position that the field setting enhances the quality of research design, but as one who has suffered the bruises of attempting to implement such projects with doctoral students, that position simply doesn't hold up.

Often, the final determination on whether or not research or evaluation will be performed, will be made by field practitioners. Certainly the researcher will have the opportunity to persuade others to his or her line of thought, but frequently important studies (at least important to the researcher) will simply not be allowed to happen. In conjunction with that, it is likely that the research focus will be almost exclusively in "applied" areas. Frequently the criteria used to make judgments concerning the acceptability of data gathering strategies will be the usability of the information and its relationship to the ongoing teacher center program.

There is likely to be an ongoing conflict between researcher and field practitioner in regards to the "quality" of the evidence. Usually, the researcher will attempt to push the quality of the data upward, while the practitioner will often find it difficult to understand the need to inconvenience himself or herself in order to accommodate this factor. Thus the researcher will be forced to exhibit a great deal of sensitivity to the subjects and be willing to negotiate trade-offs more frequently than is desirable. For example, while time is not an academic virtue, it is frequently a programmatic virtue when dealing with real children in a school setting. By the same token, where precision in measurement will be of crucial importance to the educational researcher, it will frequently be difficult for the practitioner to see the need to render "such obvious results" with empirical precision.

Finally, the educational researcher must always keep in mind that teaching centers exist for purposes other than the generation of information. Teaching centers exist as a place for teachers and other educational practitioners to enhance their skills to better perform their jobs. There is usually a clear mission statement reflected in terms that emphasize the need to help children. Consequently, a researcher, if care is not exhibited, may be placed in the unenviable position of attempting to promote his or her interests at the expense of a child's education. Whether or not this is the case, it is a perception that frequently intervenes between the data gatherer and the field.

On balance, though, this writer would contend that the teaching center provides a unique and exciting environment for the creative question-asker. The "sweet" far outweighs the "sour." Given the ability to develop the flexibility and patience that historically have not characterized educational researchers, it just might be possible to finally bring teacher education to that elusive measure.

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SUPPORT SYSTEMS TO IN-SERVICE CBTE PERSONNEL, ON CAMPUS AND OFF CAMPUS

Karl Massanari

This conference rests on the premise that a research and evaluation component is critical to the success of operating CBTE programs. We have heard presentations of two conceptual models for designing such a component and the importance of three support systems to the effective implementation of a research and evaluation component. Another support system is the provision of inservice education for CBTE personnel. I am interpreting the assigned topic to mean: How does one go about educating people to conduct and participate in research and evaluation efforts related to CBTE programs? The underlying assumption of this paper is that the research and evaluation component of every CBTE program should have a training element, just as every CBTE training program should have a research and evaluation component. Without a solid support base on the part of the people who are to be involved, research and evaluation activity will be unproductive, if not a waste of time.

The basic general question which this brief paper addresses will be treated under four headings:

1. What is the nature of research and evaluation in CBTE programs?

2. Who are the people who should be involved in research and evaluation activity?

3. What kind of support do we need from them?

4. How do we go about getting it?

1. What is the nature of research and evaluation in CBTE programs?
An examination of the meaning of words we commonly use to describe what we are doing can be a useful exercise, useful not only for the sake of clarification but also, in this case, for clues as to what the substance of research and evaluation inservice education should be. A Webster's Seventh New Collegiate Dictionary provides help for such an exercise.

The verb "evaluate" is one of a cluster of words related to the broader term "estimate". To **estimate** means to judge or to give an opinion. The judgment is tentative and approximate, and precedes or takes the place of actual measuring or counting or testing out. To **appraise** implies fixing by an expert of the monetary worth of a thing, but may also be used for any critical judgment. To **value** equals appraise but without expertness of judgment. To **rate** adds to estimate the implication of fixing a scale of values. To **evaluate** suggests an attempt to determine either the relative or intrinsic worth of something in terms other than monetary. To **assess** implies a critical appraisal for the purpose of understanding or interpreting, or as a guide for action. Three key ideas related to making judgments emerge from these definitions and have relevance for our purposes at this conference.

1. **Nature of judgments.** They are to be characterized by such terms as non-finality, tentativeness, approximations of truth, degrees of accuracy, all of which imply that they are subject to revision and refinement.

2. **Judgments are made in terms of something:** expert opinion, anyone's opinion, pre-determined value scales, raw data, analyzed data, etc.

3. **Judgments are made for some purpose:** understanding, interpretation, guides for action.

Similarly, three key ideas emerge from the meaning of the term "research."

1. There is an emphasis on the "search" in "research," but a special kind of search. "Search" in this case implies a thorough investigation; a diligent, systematic study. It assumes careful planning and designing.

2. The "search" is made to discover new facts or to interpret known facts.

3. The results of the "search" lead to a revision of accepted theories, laws, or principles; and to the practical application of such revised theories, laws, or principles.

These key ideas for the terms "research" and "evaluation" set forth their meaning as used in this paper.

2. Who are the people who should be involved in research and evaluation activities related to CBTE programs?

When one considers the critical importance of a research and evaluation component in CBTE programs, and the wide array of significant questions for which we seek answers through research and evaluation activities, the answer to the question: Who should be involved? seems clear enough, that is, all of the people involved in the training program should be involved in research and evaluation efforts. They will, of course, be involved differently and at different levels of sophistication, but they will **all** be involved. This means that an inservice education support system for research and evaluation will be both comprehensive and complex. It will be comprehensive because it should attempt to meet the needs of **all** of the involved persons; complex because their needs will be different. I submit that in some way or another, directly or indirectly, the following groups of people need to be involved in a sound research and evaluation program:

1. college/university administrators and faculty members who participate in designing and implementing CBTE programs.
2. educational researchers who design and conduct research and evaluation activity,
3. students in teacher education programs,
4. school personnel (administrators, teachers, etc., who participate in designing and implementing CBTE programs: individually, collectively as school faculty, and collectively as the organized profession,
5. teacher center personnel (if there is a teacher center)
6. school pupils
7. school board members
8. state department of education personnel
9. lay public/taxpayers
10. legislators—decision makers

The view that many different persons will be involved in research and evaluation efforts assumes not only that there should be a broad base of involvement in planning for and conducting such efforts at the local level, but also that some research and evaluation activities will be carried on by institutional consortia and others at the state level. Even though some of these groups may be involved only indirectly, there are times when their support is essential to the carrying out of a productive research and evaluation program. This suggests that CBTE program operators must attend to the building up of a comprehensive support base for research and evaluation efforts, and this brings us to the third question.

3. What kind of support do we need from these groups?

This question may be asked in another way. What is it that these groups need to know about research and evaluation? What must be unlearned and what must be learned? What attitudes do they need to have toward research and evaluation? What fears and anxieties must be alleviated and what positive attitudes need to be developed? What must they be able to do? What skills are needed? In other words, what are the competencies they need to have to conduct and participate in research and evaluation activity? To answer these questions, one might attempt to identify the desirable competencies for each group. Or, as I will attempt to do in this paper, one can spell out the desirable competencies needed to support a research and evaluation component and then relate them to these groups.

First, through the communication of appropriate information and in appropriate ways, there should be on the part of all involved persons some awareness of what is going on and why. For some groups such information will need to be at a very elementary level, for others it should be at more advanced levels.

Second, the different groups need to possess appropriate levels of understanding about the objectives, methodologies, and findings of research and evaluation activity. An understanding of what is going to happen, what is happening, and of what happened contributes to the productiveness of research and evaluation activity.

Third, those who participate in research and evaluation activity should do so within an experimental frame of reference, that is, they need to have enough openness and flexibility to say, "Look, what we are doing now may not be the best or only way to do it. Let's try another approach; maybe it will be better than what we are doing now." They need to have an experimental frame of reference which reflects an awareness and understanding of the fact that most of what we do in teacher education rests without much support on untested assumptions and hypotheses.

Fourth, participants in research and evaluation activity—particularly those who are responsible for administering CBTE programs and for providing classroom instruction—need to be receptive to the results of research and evaluation efforts. They need to be willing to modify practice in light of feedback from the results.

Fifth, some of the people who are engaged in research and evaluation need special technical competence which prepares them to carry out their responsibilities. Varying kinds of technical competence are needed by those persons who are responsible for designing research studies, constructing assessment instruments, making classroom observations, applying statistical procedures, analyzing research findings, etc. Such technical competence is needed to support research and evaluation efforts. If it is not readily available from existing resources, inservice education opportunities need to be provided to supplement that which is already available.

4. This leads to the fourth and last question:

How do we go about getting the kind of support we need to engage in productive research and evaluation activity in relation to operating CBTE programs?

Rather than list a number of specific ways to accomplish what we are after, I have opted to identify several guidelines which seem to me to be more important than a list of particular ways an inservice education program might be implemented.

First, training to conduct and participate in research and evaluation activity should not be thought of as limited to the domain of CBTE type training programs. Since all of teacher education is based largely on untested assumptions and hypotheses, and since the body of knowledge concerning the relationship between teacher behavior and pupil learning outcomes is relatively small, it is important, if not imperative, that all types of educational personnel development programs include some attention to the place of research and evaluation in teacher education and in education generally. This emphasis on research and evaluation should be reflected in preparation programs not only for classroom teachers, but also for college professors of education and administrators, school administrators, professional support staffs in schools, and state department of education personnel.

Second, training to conduct and participate in research and evaluation activity in relation to CBTE programs should not be thought of as limited exclusively, or even primarily, to the domain of inservice education. If some understanding about research and evaluation is important, if an experimental frame of reference toward teacher education and education is important, then we ought to conceptualize professional roles accordingly, formulate appropriate competency statements, and include them in preservice CBTE programs. This is not to say that the achievement of such competencies would eliminate the need for inservice education, but it would certainly change its nature and at the same time lay the groundwork for engaging in research and evaluation activity earlier than would otherwise be the case.

Third, the designing and planning for research and evaluation activity should involve the participation of the appropriate groups who will be engaged in the activity. This is not to say that everyone will bring the same degree of expertise to the task at hand. Such participation should lead not only to a better understanding of what is to take place but also should contribute to the development of positive support for participation in the research and evaluation activities which have been planned. It should contribute also to a readiness to modify practice in light of the findings of research and evaluation efforts.

Participation by the involved groups in decision making about research and evaluation activity is sound both educationally and politically. In the case of the organized teaching profession, such participation may actually be a requirement. A broad base for decision making about research and evaluation activity contributes to the building of a solid support base.

Fourth, the findings of research and evaluation activity—both positive and negative—should be shared with those who participated in the planning and implementation of the activity. This means that provision must be made for an interpretation of results, for translating the findings into useful language which can be used as a basis to modify practice. Research and evaluation efforts are of little value unless the results are fed back meaningfully into the training program and classroom.

Fifth, provisions should be made to ensure that the research and evaluation component of the CBTE program is effective. This component itself must be subject to evaluation and modification. Such provisions make quality control possible and in turn, improved training programs.

Returning to the underlying assumption of this brief paper, namely, that the research and evaluation component of every CBTE program should have a training element, I have argued that inservice education support systems should be comprehensive enough to meet the diverse needs of all of the persons who are involved in research and evaluation activity, that we need to delineate the kinds of competencies needed by these persons to support our research and evaluation efforts, and that within broad guidelines for action we need to devise means for them to achieve these objectives. If we do this, our research and evaluation efforts can be productive and contribute to expanding the undergirding body of knowledge not only for individual CBTE programs, but for all of teacher education.

IMPLEMENTATION OF THE COMPREHENSIVE RESEARCH AND EVALUATION MODEL AT THE UNIVERSITY OF TOLEDO

William W. Wiersma, Jr., Marcia L. Mutterer,
Stephen Jurs, Thomas G. Dunn, Stuart J. Cohen
and Thomas Gibney

Introduction

The model for research in teacher education is described in an earlier paper by Dr. Soar. A simplification of an effects model is diagrammed later in this chapter in Figure 4. The discussion in this chapter deals with the components that are required in implementing a research program based on an effects model.

Focusing specifically on the CBTE program and the competencies developed, we could view the links simply as shown in Figure 1.

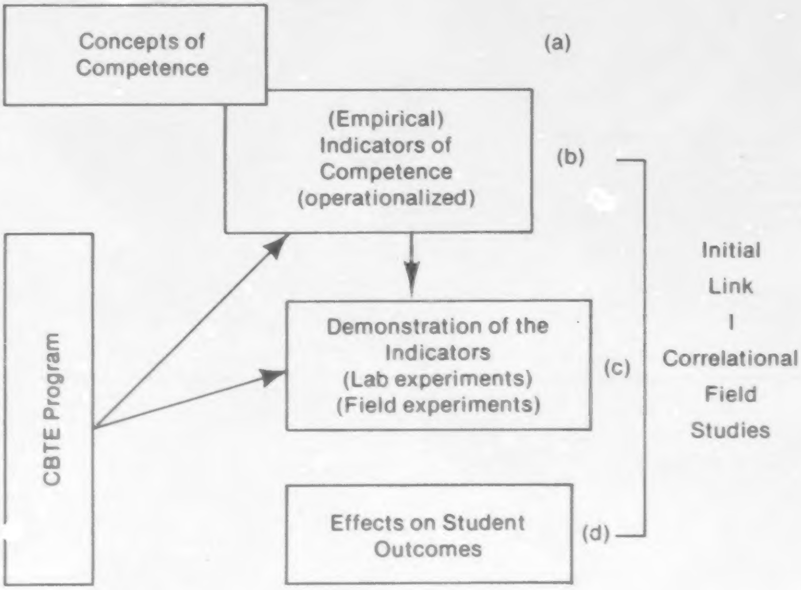

Concepts of Competence
(a)
(Empirical) Indicators of Competence (operationalized)
(b)
CBTE Program
Initial Link I Correlational Field Studies
Demonstration of the Indicators (Lab experiments) (Field experiments)
(c)
Effects on Student Outcomes
(d)

Figure 1
Schematic Representation of Relationships of CBTE Program and Competencies Developed

Concepts of competence do not require a CBTE program. They can be conceptualized on an **a priori** basis. The empirical indicators of competence do require some type of operational, "teaching-learning" situation. However, such a situation would not need to be structured within the context of a CBTE program. For example these indicators could be identified using experienced teachers.

The research program would have its major concentration on the demonstration of the indicators of competence. With a CBTE program the demonstration can be structured in either a laboratory or field context. The laboratory context can and most likely will involve the use of peers and selected groups of students. The field context will consist extensively, but not exclusively of the student teaching experience.

The effects on student outcomes is the final link in this chain from competencies to outcomes. Establishing the links between (a) and (d) through all the intervening variables in the real situation, is the comprehensive goal of the research and evaluation program. The validity of the concepts of competence will be tested by observing the effects on student outcomes of acquiring and using the "skills" defined as the relevant teaching competencies. Obviously, the four components linked above are an oversimplification of the model. The remaining part of this chapter is an expansion of the model.

The Conceptual Base and Assumptions of The University of Toledo Program

The importance of clarifying the basic assumptions that underlie a competency-based teacher education program cannot be overemphasized. Professional educators will not accept a competency-based model if it is not associated with sound educational assumptions that are identified and traced to educational theory. In addition, no program deserves a research effort without that conceptual base. Competency-based teacher education is an organizing element in our design; it does not automatically spell out **what** teacher performances are to be included.

In their papers Del Schalock and Gilbert Shearron noted the need for a total effort to deal with educational complexity by considering all aspects of the educational process. In this way efforts can result in producing educational change and benefits for children as well as university teacher education programs. This is a basic assumption in the Toledo program as well.

The competency-based teacher education design produced at The

University of Toledo is an attempt to bring the University, the public and parochial schools, and the community into various coalitions that function cooperatively in a preservice and inservice teacher training program. It is a comprehensive educational reform-renewal strategy for a region, a city, and their educational institutions. It involves a systems approach and modeling in developing, organizing, and operationalizing a considerable educational change effort. The basic organizing elements in the system are the development of multiunit schools (involving differentiated staffing, team teaching, etc., a concept developed at the Wisconsin R and D Center for Cognitive Learning), individually guided education, competency-based education and competency-based teacher education. These elements are effectively linked together to create a climate for and support of a strategy for massive educational change.[1]

The change model which has been created and implemented is presented in Figure 2. It reveals a successful combination of educational programs, institutions, personnel and facilities joined together by a concept and facility labeled a teacher education center. The teacher education center serves as a teacher education laboratory and an integrating unit for a variety of preservice and inservice teacher education activities. These activities result in a process for the improvement of teacher competency involving the use of behavioral objectives, individualization of instruction, program modularization, competency-based criteria (knowledge, performance and product [consequence] criteria), and a continuous feedback and evaluation system.

The Teacher Education Center is the source of a total effort to deal with educational complexity by considering all components in the educational process with the result of producing educational change and benefits for learners in elementary schools, secondary schools, and university teacher education programs. The fundamental effort is: (1) to produce teacher behaviors that can be identified, tested, and proven relevant by establishing the relationships of such behavior with pupil behavior and outcomes, and (2) to create and facilitate an effective, positive learning environment and school operation conducive to the well-being of all children.

Such a lofty purpose is admirable, and we would perhaps agree that this is a valid framework for research. But where does one start?

The University of Toledo Competency-Based Teacher Education Program has a sound theoretical base.[2] This base is constructed from two sources: (1) fundamental program assumptions, and characteristics of the program that express these assumptions; and (2) the ten broad goals of education from the original model.

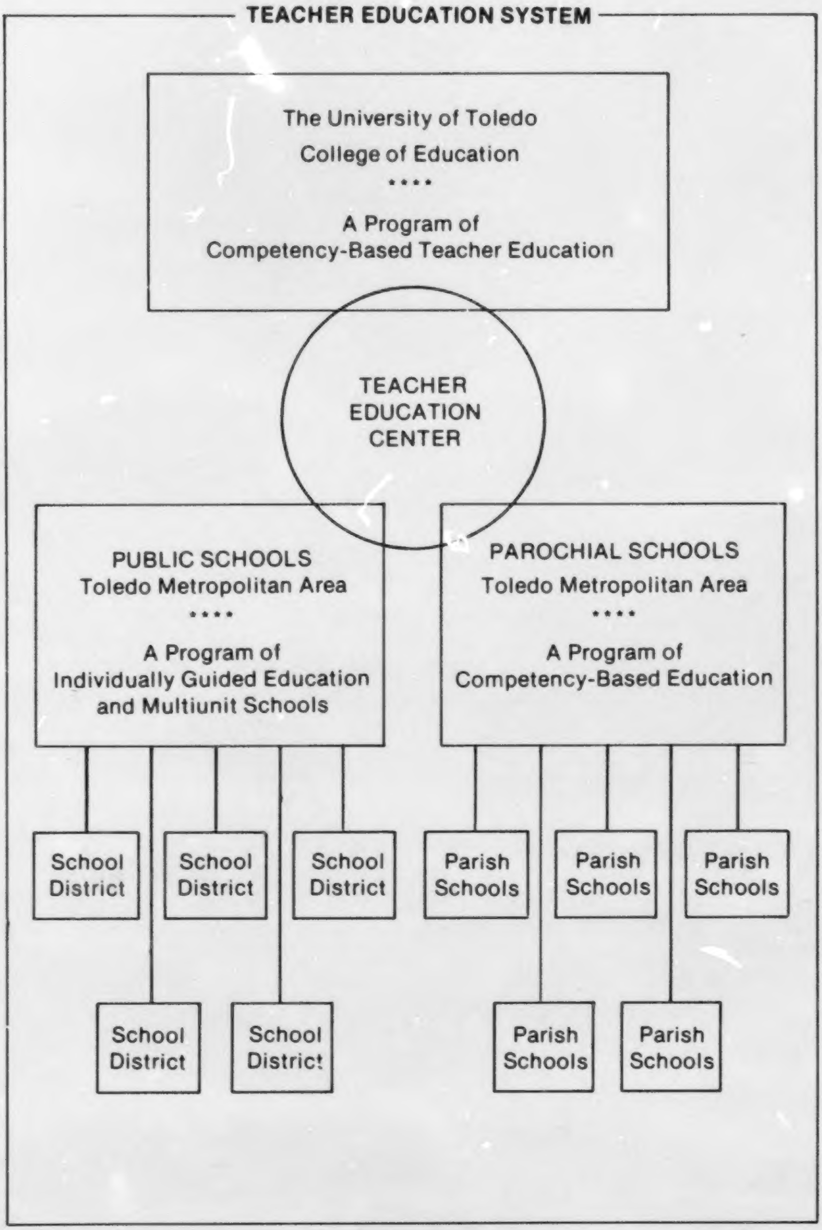

TEACHER EDUCATION SYSTEM
The University of Toledo
College of Education
* * * *
A Program of
Competency-Based Teacher Education
TEACHER
EDUCATION
CENTER
PUBLIC SCHOOLS
Toledo Metropolitan Area
* * * *
A Program of
Individually Guided Education
and Multiunit Schools
PAROCHIAL SCHOOLS
Toledo Metropolitan Area
* * * *
A Program of
Competency-Based Education
School District
School District
School District
Parish Schools
Parish Schools
Parish Schools
School District
School District
Parish Schools
Parish Schools

Figure 2
A Comprehensive Model for Educational Reform and Renewal

The first fundamental assumption is that a design for teacher education would require a continuing educational process for all persons (students, teachers and administrators) in **all** types of educational institutions involved with teacher preparation. Reference to all groups of educational personnel means **all** persons actively involved in the education, induction, and support of new teachers, with such groups becoming the major target populations for a changed program in teacher education. These groups were identified as three preservice populations (preschool and kindergarten teachers, elementary teachers in grades 1-8, and paraprofessionals—teacher aides) and inservice personnel (college and university personnel school administrators, and inservice teachers).

It was assumed that the creation of a new, challenging teacher education model would result in corresponding changes and innovations in the school settings where the new teachers prepared in the model would be placed.

This assumption mirrors Shearron's notion that we have to change the world in which we do research if we are to be successful researchers. Consequently, the concept of teacher preparation for a graded, self-contained classroom was abandoned and there was incorporated the idea of the multiunit school and the team teaching approach developed by the Wisconsin Research and Development Center for Cognitive Learning.

A further assumption was that the goals of education and teacher education must be congruent. What are the desired outcomes in pupil behavior? What are the teacher behaviors that cause them?

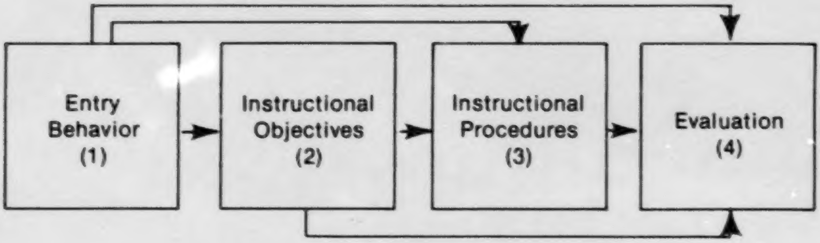
The comprehensive goals of education prepared by the Committee on Quality Education for the State of Pennsylvania were modified to support teacher education purposes.[3] They were then reviewed for teacher education goal legitimation by a national committee of prominent educators. This process resulted in ten broad goals of teacher education. These goals specified relationships between teacher behavior and pupil outcomes, and were the starting point in a process to develop more specific and enabling objectives for the Toledo program.

In transforming these goals and assumptions into relevant behavioral objectives for further program development, another major assumption was made. We generated five conditions of life and education of major importance to teacher education. We called these conditions "contexts" and identified them as Instructional Organization, Educational Technology, Contemporary Learning-Teaching Process, Societal Factors, and Research. We believed that these contexts represented the more important sources of change in teacher education today. An authority in each context field prepared a position paper on his topic. Other authorities in the context field were provided with the completed position papers and asked to react to them. The papers and the reactions provided a rich source of data for the preparation of behavioral objectives.

In essence, the broad, adapted goals of teacher education were refined by considering them from the perspective of the five contexts. Over 2000 behavioral objectives were prepared within the five contexts for the development of preservice and inservice instructional programs. The college faculty used these objectives as the starting point in program development, and cooperatively wrote the instructional modules for the present program. Continuous evaluation and consequent revision has refined these modules through three years of implementation. Formative evaluations of the match of the original goals to the present objectives have been carried out to continuously examine the fit between the present program and our original conceptual base.

In the preservice programs, the conceptual process was further advanced by considering in both the elementary and secondary programs what a "successful teacher" should be able to do so as to generate a comprehensive list of teaching skills and also a potential sequence for teaching such skills. The process utilized required an analysis of environment, assessment of needs, identification of objectives, specification of instructional strategies, constructing and implementing prototype programs, and program evaluation and revision. Thus, the identification of teacher competencies resulted from this total conceptual framework.

It is as a function of this total conceptual base that the preservice teacher is training to be a decision-maker: (1) to diagnose each child's current level of affective and cognitive development so that he/she may (2) choose both affective and cognitive content objectives and (3) instructional strategies. The effectiveness of his/her choices is consistently monitored by (4) measures of the child's success.[4]



The school becomes the laboratory for training effectiveness as teaching competence is developed in preservice teachers.

There are additional characteristics of the program that determine the direction for research. The program's heavy field component, evident from the freshman to the senior year, is necessitated by the performance-based nature of the modules of instruction. Each module, together with a statement of key concepts and rationale, specifies behavioral objectives, alternative instructional strategies, and pre- and post-assessment criterion measures. Each concept and competency is demonstrated by the preservice teacher in IGE/MUS schools with children. Each student is required to reach satisfactory criterion on each module. Further, the time required for any candidate to complete the training program depends, basically, on the satisfying of performance criteria.

There is also the requirement that all elements or target populations in the educational system involved with the program must be given appropriate and adequate training and re-training to the degree needed and possible in each situation. We explain the program to teachers, and include their feedback in revisions. Teacher preparation is considered continuous with preservice and inservice education on a continuum.

Individualization is available to some extent in the Toledo CBTE program. Individualization makes possible student learning activities independent of other learners. A consistent effort is also made to personalize the program, and to make it responsive to student affect. Personalization enables students to state and know exactly what they want to do as well as what they can do; they are then held accountable for demonstrating the competencies they have helped to define and have agreed to achieve.

Individual student affect is consistently measured by objective measures at the same time the student takes the postassessment for each module. Attitudes toward the program are measured through questionnaires, and students are encouraged to express their concerns to their personal advisor, or during small group sessions held for that purpose.

The college instructional organization in which the program is operated is quite similar to that used in a multiunit school which is the organizational plan used in cooperating schools. (See: Herbert J. Klausmeier and others in **Educational Comment 1969: Contexts for Teacher Education** published by The University of Toledo.) Clusters of modules are taught by interdisciplinary teams of professors from a variety of disciplines (educational psychology, instructional technology, social foundations, and math, language arts, social studies and science education). Each team leader holds regular meetings with the team for planning instruction and for coordinating field experiences with the school facilitator. The facilitator is a professor and recognized member of the school staff responsible for supervision of student field experiences and for coordinating inservice education at the request of teachers involved with the program.

Another characteristic of the program is its computer operated student assessment system. Preservice teacher performance and attitudinal data per module and objective(s) provide constant, consistent information leading to the development of better criterion measures, more appropriate instructional strategies (given the learning style of the student), and better behavioral objectives. Each student's progress through the modules at any point in time can be obtained via computer printout by his adviser. A continuous data base for measurement of teacher competence is maintained. The use of such information aids program self-improvement and self-renewal through the use of prompt, objective, program feedback.[5]

The faculty organization and structure to guide the development and implementation of the CBTE program is a process system which utilizes a College Instructional Improvement Committee as its coordinating unit. This committee consists of 27 members and includes college administrators, CBTE teaching team leaders (faculty), various CBTE committee chairmen, school personnel and students. The committee oversees and provides policy for (1) the contextual-developmental-evaluative process (involving the activities of the Assessment and Evaluation Committee, the Team Council and the teaching teams, and the Revision and Planning Committee) and (2) the program support process (consisting of the Teacher Education Center, school satellite centers, and the Student Field Services Office). All processes are channeled through the College Instructional Improvement Committee and then considered, when necessary, by standing college committees and the college faculty. The administrative offices of the College implement and supervise the policies and actions taken by the appropriate units described above.[6]

The mechanism that facilitates university-school relationships is the Teacher Education Center. In its observable form, this center consists of a campus laboratory used to design instructional systems, to develop instructional materials, and to demonstrate new techniques. In its less observable form, the center consists of the network of services that the

University performs for the schools and that the schools perform for the University. The visibility of the center concept is seen in the preservice teacher who demonstrates competencies in the field and/or is a member of an instructional team in an IGE/MUS school, the university facilitator who performs a variety of roles as a school staff member, and the university consultant who inservices teachers. The school's services are represented by the teachers, who with university instructional team members, evaluate preservice teacher performance suggest program changes, and lend facilities for all these activities.[7]

A well-designed and functioning program with a strong conceptual base is the place from which we expect to conduct research on the effects of teaching performances. We have available a cadre of preservice teachers who have acquired teaching performances to sufficient but different levels of skill. These teachers can be observed teaching pupils under known conditions of schooling, and the effects of preservice teacher performance on pupil outcomes may be observed.

In sum, the assumptions and characteristics of the program are conducive to research in that: First, the concept of the role of the teacher that underlies the design of the program is that of the professional decision-maker. Such a concept requires that the research program study not only what a teacher does but also the kinds of decisions the teacher makes as he/she engages in teaching. This type of research on teaching has yet to be done and its lack is widely regarded as a major limitation of previous research. Second, teachers in the Toledo program are trained to work in complex teaching environments whereas most previous research has studied the teacher in the single-teacher graded classroom. Third, the research will have immediate payoffs in the revision of the training program itself and in the redesign of the training activities of the Teacher Education Center.

We may expect this research program to provide basic knowledge on the effectiveness of teaching performances and improved training strategies.

The Research Plan

The instructional program has reached a stage of maturity in terms of the stability of the modules and the objectives which will allow rigorous research on aspects of CBTE. This research will be a series of integrated studies on instruction as well as a validation of the CBTE program. Evaluators of curricula have called for internally valid experimentation as the most fruitful avenue of program validation. Such "hard" empiricism yields the most reliable and generalizable results. The

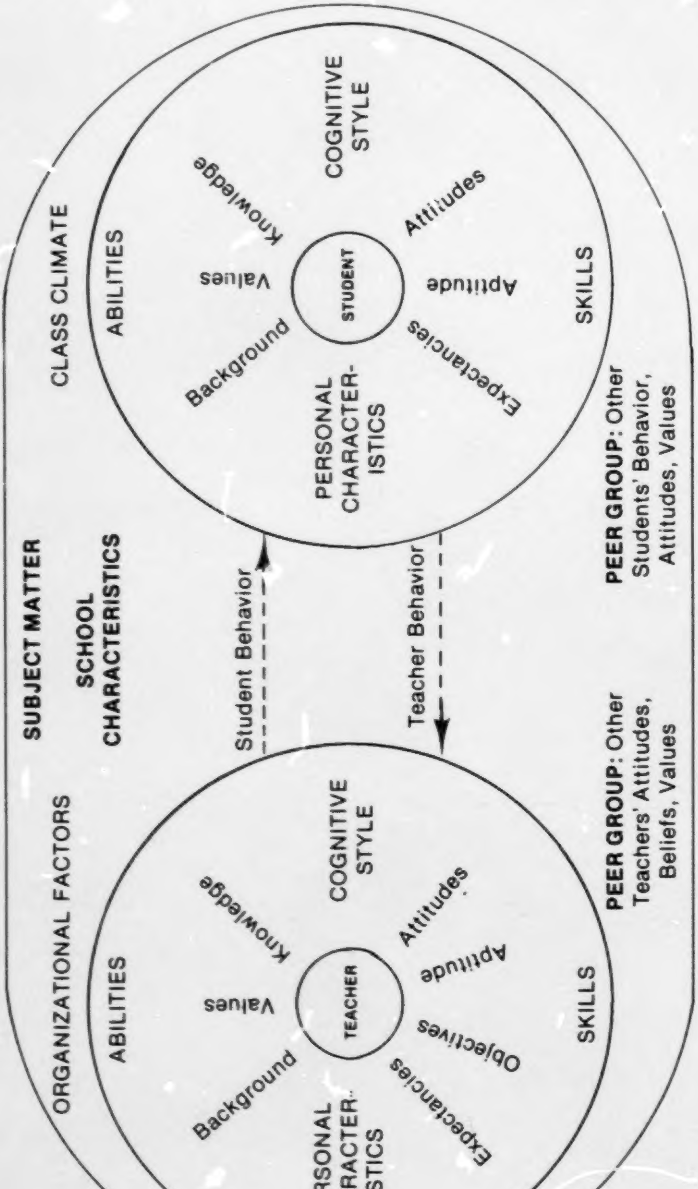

ORGANIZATIONAL FACTORS
SUBJECT MATTER
CLASS CLIMATE
SCHOOL CHARACTERISTICS
ABILITIES
Values
Knowledge
COGNITIVE STYLE
Background
TEACHER
Attitudes
Aptitude
Objectives
Expectancies
PERSONAL CHARACTER-ISTICS
SKILLS
Student Behavior
Teacher Behavior
ABILITIES
Values
Knowledge
COGNITIVE STYLE
Background
STUDENT
Attitudes
Aptitude
Expectancies
PERSONAL CHARACTER-ISTICS
SKILLS
PEER GROUP: Other Teachers' Attitudes, Beliefs, Values
PEER GROUP: Other Students' Behavior, Attitudes, Values

Figure 3
Model of Classroom Interaction Processes

Toledo program is now at a point where such experimentation is in order. The nature of research of this type is quite complex. It is important to validate the program in terms of the behaviors and outcomes of the pupils of the teachers trained in our program. This means that the nature of the training program, the nature of the teacher, the nature of the pupil, and the nature of the school must be considered simultaneously so that the influence of each can be estimated.

The figure indicates the foci for research in our investigative efforts. Both the teacher, our student teachers, and the pupils can be seen as a complex of values, backgrounds, and abilities. The main thing that separates our research plan from previous efforts is that we hope to coordinate our studies rather than doing them piecemeal and wishing later that an integrated picture of results would emerge. The pattern of research studies should show interdependencies among studies. One study should follow logically from another. The hypotheses of the later studies should be refinements and extensions of the results of the earlier studies.

The links that will be investigated are represented in Figure 4. Each arrow in Figure 4 stands for a class of studies. Each class is comprised of research on a large number of variables. For example, the arrow connecting teacher training and teacher behavior is to a great extent the validation of our program.

Our primary goal is to establish connective links as represented by Figure 4. We plan to do this through a coordinated series of correlational and experimental studies. The correlational work will primarily use observational and test data that will be related through path analysis and other structural analyses. Stronger cause and effect results will hopefully be provided through experiments conducted in the laboratory setting of the university and in on-site school situations.

There are seven major characteristics of this research plan:

1. Hypothesis generation and validation

   The early correlational studies will lead to hypotheses to be tested in the experimental studies.

2. Empirical results as quantifiable data

   Instrumentation that is required should result in strong measurement for many variables.

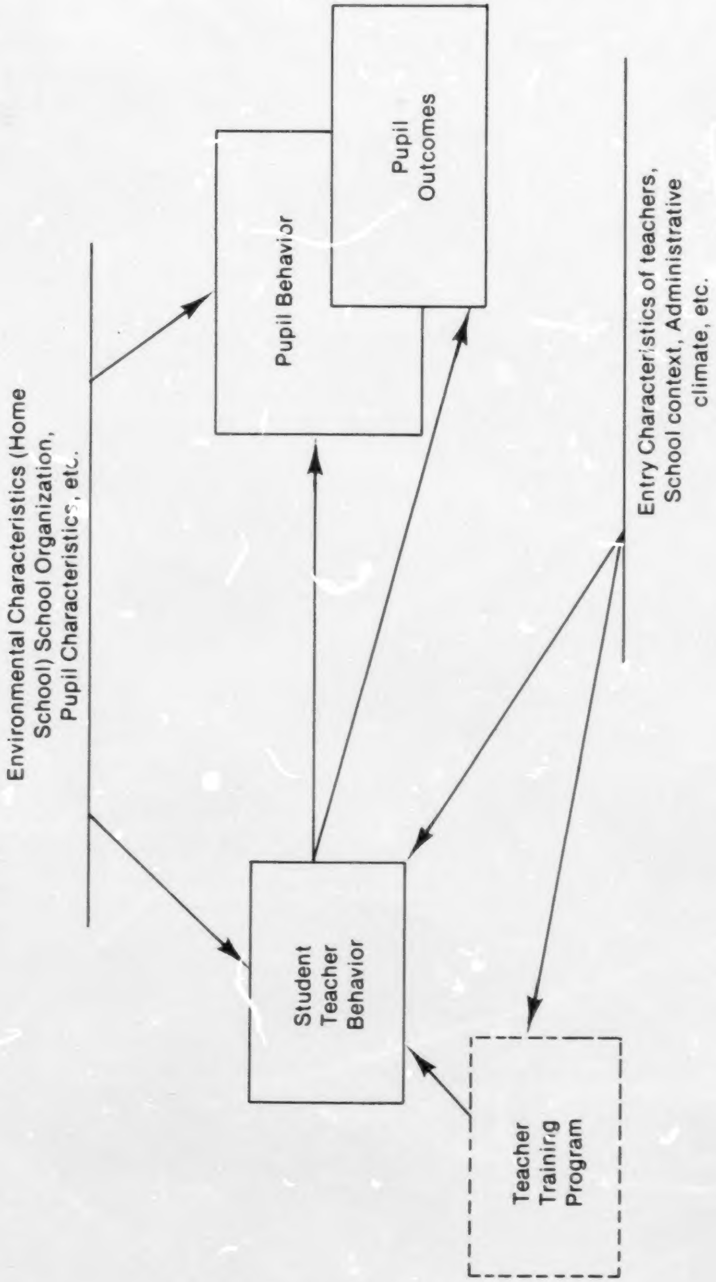

Environmental Characteristics (Home School) School Organization, Pupil Characteristics, etc.
Pupil Behavior
Pupil Outcomes
Entry Characteristics of teachers, School context, Administrative climate, etc.
Student Teacher Behavior
Teacher Training Program

Figure 4.
General Model of Effects in CBTE

3. Includes both elementary and secondary CBTE

   The effects of CBTE may be more salient in one level of education.

4. Experimental conclusions from lab studies

   The university offers a setting for rigorous control over contaminating variables.

5. Experimental conclusions from field studies

   The schools offer a realistic setting to study the effects of other influences.

6. Correlational studies from field studies

   Observation in a natural setting allows testing and generation of hypotheses.

7. Field follow-up beyond certification

   The long term effects of training should show some measure of its potency.

Such a large scale undertaking will require many activities. Among these is the need to construct valid measurement systems for the variables that are to be included. A second important activity is finding means to manage all of the data that will be gathered. The present computer-managed instruction system may have to be modified to accommodate these new needs. Third, there is a need to manage people. A cadre of observers, testers, clerks, and others will have to be coordinated and directed. And, finally, there is a need to manage the research program. The interrelationships among the studies and the time schedule to be maintained will need to be directed in a fair and efficient way.

We turn now to the details of the studies that we plan to conduct. First, the correlational field studies will be described and then the experimental studies will be developed.

Correlational Field Studies. The series of correlational field studies will serve primarily as the hypothesis-generating component of the research program. Data will be gathered from student teachers, pupils, and the school context. Student teacher data will include such things as personal characteristics, performance in previous modules in the CBTE program, and level of performance on a specific teaching strategy being implemented. Some of the specific teaching strategies to be observed are: convergent inquiry, divergent inquiry, behavior modification, value clarification, and concept lessons. These strategies arise from different models of teaching.[8] Each teaching strategy has been identified and criterion observation instruments are available to a limited extent. Preliminary data, used primarily for developmental purposes, have been collected for current student teachers. To insure observer reliability throughout the data collection of the research program, instruments will be further pilot-tested and refined and observers will receive appropriate training.

The data representing pupil outcomes will be quite varied and will consist of such information as observations of classroom behavior, scores on both teacher-made and standardized tests, and scores on affective inventories. The primary source of pupil outcome data will be changes in performance from pretest to posttest on a variety of objectives in several content areas. The initial areas to be included will be reading and mathematics, since there is some commonality of programs in these areas among the schools involved. Many of the schools use the Wisconsin Reading Design and the Toledo Mathematics Program. Both of these programs are instructional systems with emphasis on individualization. In both reading and mathematics there are certain skills and content areas which predictably cause problems for pupils. These problem areas will serve as a major source for content and objective constancy, while the teaching strategies and school contexts vary.

Pupil outcomes can be considered in a two-dimensional matrix of content area by strategy, and such a matrix is provided in Figure 5. Within each content area and strategy, specific, cognitive, pupil outcomes can be identified and investigated. Examples of such outcomes are presented in the cells of the matrix of Figure 5. Some cells in the matrix are blank, since it is unlikely that, in the actual field situations, student teachers will use every strategy in every content area.

Although to some degree the teaching strategies are heterogeneous by nature, there is enough commonality of the thinking process within a teaching strategy that comparisons can be made across content areas. Comparisons across strategies can be made within content areas.

Equating pupil outcomes is more complex when comparing across subject matter or even within subject matter that has substantial diversity. Such comparisons will be made in most of the secondary program and in science and social studies in the elementary program.

The common characteristic throughout the CBTE program is the system of activities that results in effective teaching. Regardless of subject matter or grade level, teachers engage in four major activities: (1) to diagnose individual student's strengths and weaknesses, (2) to plan and prescribe instructional strategies to ameliorate the deficiencies, (3) to implement the strategies selected, and (4) to evaluate the success of their efforts. All student teachers are required to have detailed plans prior to instruction of any lesson. The objectives for each lesson can be classified by a variety of content-free pupil outcomes such as the number of objectives to be mastered, the thinking level or cognitive process required to master each objective,[9] or even the level of moral development.[10]

	Content Area			
Strategy	Reading	Mathematics	Social Studies	Science
Convergent Inquiry	Literal Comprehension	Algorithm Estimation	Generalizations —Application	Laws
Divergent Inquiry	Inferential Comprehension		Generalizations —Deriving	Experiment —Design
Behavior Modification	Decoding	Computing		Techniques
Value Clarification	Literature Appreciation		Political Values	Ethics
Concept Lesson	Concepts	Concepts	Concepts	Concepts

Figure 5
Content Area by Strategy Matrix for
Classifying Pupil Outcomes, With Example Outcomes in the Cells.

The correlational field studies should provide a broad enough data base to assess the relationships between variables in several, typical educational settings. Significant relationships between teaching strategies and pupil outcomes in a particular school context will suggest potentially valuable experimental studies. The absence of empirical support for expected contingencies will be equally useful in developing a link between teacher performance and pupil outcomes.

Experimental Studies — Laboratory Setting and Field Setting

The experimental studies, in general, will assess the link between teacher performance and pupil outcomes in controlled settings. The advantage of experimental studies over the correlational field studies is that a more direct cause and effect association can be inferred. The difference between the experimental studies in the laboratory and field settings is one of degree of control as well as the setting.

The laboratory setting experimental studies will be those that take place in the teacher education program prior to the student teaching experience. Many of these will be on campus, involving peers instead of elementary and secondary pupils. Maximum control of factors can be exercised, varying only one or a few factors per experiment.

The field setting, experimental studies will take place during the student teaching experience. At least some measure of control can be exercised when implementing these planned experiments. Control will be somewhat less than for the laboratory setting experiments.

Most of the independent and dependent variables used in the experimental studies will be similar to the variables investigated through the correlational field studies. Independent variables will include teaching strategy and corresponding level of teacher performance. Dependent variables will be pupil behavior and pupil outcome variables such as the nature of pupil participation (pupil behavior) as well as their performance on criterion instruments (pupil outcomes). The experimental studies will include pretests and random assignment of treatments to classes. In all of these studies the objectives and content can be controlled so that valid comparisons can be made across comparison groups. To make comparisons across content, experiments will be designed in which the cognitive outcomes will be controlled and the teaching strategies randomly assigned. Such an experiment permits one to determine whether a particular teaching strategy is uniformly appropriate for eliciting pupil outcomes at a specified cognitive level across content areas.

Follow-Up Field Studies

In addition to the correlational and experimental studies, follow-up field studies will be performed to determine the long range effects of the undergraduate education. That is: To what extent does the school context weaken or strengthen the effects that are identified among preservice teachers? Do teachers educated in a CBTE program act as change agents in various school settings?

The data base for the follow-up studies will come from two sources. These are the information stored on each student's performance on every module in the CBTE program prior to student teaching and the information on the student obtained during student teaching, including performance in both field and experimental studies.

The follow-up studies in the elementary program will focus initially on reading and mathematics while studies in the secondary program will be in English and social studies. Later studies in both elementary and secondary programs will be expanded to include a wide range of content areas. Such a strategy will allow us to determine whether initial findings generalize across content areas. The amount of data collected will remain somewhat stable throughout the follow-up. For example, as more secondary student-teachers in mathematics and science become available, fewer numbers of student teachers in social science and English will be included in the follow-up.

The basic context in which the research program will be implemented is the usual quarter system (fall, winter, spring) over an academic year. The activities of the research program are planning, pilot testing, and implementation. These are designated by PLAN, PILOT, AND FULL, respectively in Figure 6, which summarizes the research program over a five year period. The Xi's represent experiments to be conducted and Fi's represent the data collection points in the follow-up studies.

Products and Outcomes

The short-range and most apparent products of the research program will be the knowledge products dealing with CBTE and the effectiveness of teaching in general. The most direct knowledge products can be summarized as:

1. The identification of the relationships between the numerous variables studied, specifically as they are in the categories of CBTE program variables, teacher behavior vari-

		Year 1			Year 2			Year 3			Year 4			Year 5		
		Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring
Elementary	Field Study	PLAN	PLAN	PILOT R-M	FULL R-M	FULL R-M	FULL R-M	FULL R-M	FULL R-M	PLAN SS-Sc	FULL SS-Sc	FULL SS-Sc	FULL SS-Sc			
	Experiment	PLAN	PILOT	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	DATA ANALYSIS		
	Follow-Up							PLAN	F_1	F_2	F_3	F_4	F_5			
Secondary	Field Study	PLAN	PLAN	PILOT SS-E	FULL SS-E	FULL SS-E	FULL SS-E	FULL SS-E	FULL SS-E	PLAN M-Sc	FULL M-Sc	FULL M-Sc	FULL M-Sc			
	Experiment	PLAN	PILOT	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	DATA ANALYSIS		
	Follow-Up							PLAN	F_1	F_2	F_3	F_4	F_5			

Key		
	R:	reading
	M:	mathematics
	SS:	social studies
	Sc:	science
	E:	English

Figure 6
Scheduling of the Research Program Activities by Year, Teacher Education Area, and Type of Study

ables, pupil behavior variables and pupil outcome variables.

2. The relative effectiveness of different teaching strategies applied in various subject area and school settings.

3. The relative effectiveness of CBTE training for elementary and secondary, and the variables that interact with the levels of the elementary-secondary dichotomy.

4. Decision points in teaching process; the nature of decisions in the teaching process and an identification of the prerequisite knowledge and skills necessary for decision making.

5. The identification of most effective CBTE program characteristics, for example, the most appropriate entry points for students.

6. Comprehensive information about the operation of the CBTE program.

A by-product of the research program will be the development and refinement of cognitive and affective instruments, primarily in the areas of teacher behavior and student outcomes. These instruments will not only be valuable for related research, but they will be especially valuable for assessment and evaluation in teacher education programs, whether competency-based or not.

The research program will provide the validation for the CBTE program at The University of Toledo. It is anticipated that through the research program a great deal of development, evaluation, and modification of the undergraduate CBTE program will take place. Thus, the research program will provide for needed synthesis of conceptual and operational CBTE components into an established whole.

From a broader perspective, the research program will provide knowledge, process, skills, etc., that are transferable to CBTE in general throughout the United States and anywhere that such an approach to teacher education is taken.

There are several reasons that the results of the research program have a wide transferability? One reason is that the context in which the research is being conducted has wide scope. Individually guided education (IGE) is an instructional programming model that emphasizes, indeed mandates, that decision making be done by professionals at the point where it is needed. This means that the teacher is the primary instructional decision maker, and the role of the teacher is professionalized to a greater degree than has been the case with more traditional instructional models.

The multiunit school (MUS) instructional organization is a component of IGE. Unlike the self-contained classroom, MUS is a flexible, staff-differentiated arrangement that accommodates programming for individual students. The MUS has been described succinctly as:

> An invention of organizational arrangements that have emerged from a synthesis of theory and practice regarding instructional programming for the individual student, horizontal and vertical organization for instruction, role differentiation, shared decision making by groups, open communication among school personnel, and administrative and instructional accountability.[11]

IGE/MUS is not an educational fad or short-lived innovation. It is a well-established, alternate form of schooling that is gaining wide acceptance.[12] Research, development, and implementation with respect to IGE/MUS have been extensive, and are increasing.[13] Since the CBTE program at The University of Toledo is based on IGE as the instructional programming model, it has a base or context which is neither provincial nor traditional which considerably enhances the transferability of the CBTE program.

The CBTE program at The University of Toledo is highly field-based and we have already alluded to the importance of this model for joint decision-making between universities and school systems. The field-based characteristic also means that research results with undergraduates have direct implications for inservice programs. Indeed, the CBTE program has developed a model for close cooperation between schools and universities in the preparation of both elementary and secondary teachers.

Finally, and undoubtedly most importantly, the research program will provide the knowledge and processes by which the education of pupils, kindergarten through high school, can be improved by the more effective training of teachers. With the scope of the anticipated research, the knowledge and processes will have wide application, rather than being specific to an isolated situation.

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7. Ibid. pp. 242-247. Also see Dennis Myers, et al. **Second Stage Teacher Center and CBTE Development and Implementation, Part I, CBTE and Teacher Education Center Development.** Toledo: Center for Educational Research and Services, College of Education, The University of Toledo, June 30, 1974. (Monograph) pp. 1-17.

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12. Operational IGE schools now exceed 1500 and are found in approximately one-half the states in the U.S. The National Association for IGE has been formed and is gaining in membership. Its second national meeting will be held November 14-16, 1974 in Chicago. By the end of 1975 it is estimated that 21 states will have operating IGE networks.

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PROPOSAL FOR A CONSORTIUM OF STATES TO DEVELOP A NATIONAL PROGRAM TO IMPROVE TEACHING EFFECTIVENESS

Frederick J. McDonald

Introduction

The states have the ultimate responsibility for insuring that the quality of teaching in their schools guarantees all children a sound education and that all children have equal opportunities for receiving this education. If citizens are dissatisfied with the results of schooling, they can turn to the state to effect the changes that will make a real difference in what, and how, and how much children learn, in what they become, and what their education does for them through the years after they have left school.

Who teaches in our schools and how they teach is determined by the system that selects them, prepares them, evaluates them, and at one time certifies them and at another gives them tenure. This system has been created by the laws, policies and regulations instituted by legislatures, state boards of education, and chief state school officers and their staffs. Little change will occur if these groups do not wish to initiate it.

Numerous educational innovations have been tried in the past two decades—curriculum reform, new facilities of imaginative design, new organizational arrangements, and new technology. Despite some promising results, the magnitude of educational improvement has been small in proportion to the size of the problems to be solved.

As these innovations were tried out, it became apparent that neglect of the role of the teacher and meager concern for the teacher's competence in the context of the innovation led inevitably to meager results. Until the "new math" is conveyed through the skill of a teacher who understands it and can teach it skillfully, "new math" is little more than old formulas in new symbols.

We are at the end of a cycle during which everything but improving the competence of teachers has been tried. We are still dissatisfied with our schools, so we have turned to improving the quality of teaching in the schools. Three approaches to the improvement of teaching have been advocated or instituted in recent years. The **first** of these is the accountability-evaluation approach. This approach requires that what the schools are trying to do for children be clearly specified and measured, and then means be taken to improve educational performance (e.g., Michigan). Or criteria for teacher performance are established (usually locally) and teachers are evaluated in terms of these criteria (e.g., California).

A **second** approach is **remedial** in character. In-service training programs are created to provide teachers with special knowledge and skill. Texas, for example, has mandated that each teacher take ten in-service training days each year and support this training. Other states (e.g., New York and Michigan) are attempting to create professional development centers. Georgia has begun a program for improving the competence of administrators. New Jersey is creating Educational Improvement Centers.

A **third** approach is represented in the **competency-based** movement. This movement is essentially a reform of the system for preparing teachers and radical change in the criteria for certifying them. About half the states have taken some actions to change the system of teacher preparation and certification.

In this diversity of approaches, two major goals are apparent—(1) to focus programs on improving the competence of teachers and administrators, directing these efforts to the improvement of the teaching skills of teachers now in the schools, and (2) to change in a fundamental way the system for the training of teachers.

This proposal describes a plan for creating a national research and development program through the states. The goal of the program is to improve teaching effectiveness markedly and as rapidly as possible. Each state will develop its own approach to the improvement of teaching effectiveness. Each state's approach will be coordinated with that of other states participating in a consortium. This consortium will develop the national plan of which each state's plan will be a component. During the **first two years** of operation these plans' effect on identifying the components of teaching effectiveness and on improving effectiveness will be evaluated. During the **second phase** the results of the research and evaluation on the first phase program will be used to develop a second generation program in which states utilize what they have learned from each other's work. The National Commission on Performance-Based Education will conduct the research and evaluation program for this consortium of states.

This proposed research and development program is a concerted effort by the states to create new strategies and systems for improving the quality of teaching in the schools.

The Need for Training Programs for Experienced Teachers

In the past five years there has been renewed interest in improving the quality of education by improving the quality of teaching in schools. This interest is apparent in the rapidity with which states have moved to require that prospective teachers be certified on the basis of demonstrated competence to teach.

The competency-based movement has focused attention on competence to teach. Historically, Americans have sought to improve the quality of teaching by improving the quality of the education provided for teachers. Beginning with "Tappan's Law" which stipulated that a teacher must be educated to at least one level beyond the level of the students that he or she was teaching to the latter day requirements in many states that teachers have completed a master's degree, the amount of formal education required of teachers has progressively increased. The consequence has been a substantial improvement in the aptitudes and abilities of individuals who become teachers and the range of knowledge that they possess. The teaching force is now comprised of talented and educated individuals. The members of the teaching profession are as well-educated as members of many other professional groups and well beyond the level of education of most Americans. But, as the proponents of competency-based education repeatedly point out, desirable as these changes are, they have not insured that teachers are in fact **competent to teach.**

The competency-based movement, however, has focused its efforts on the improvement of the beginning teacher by urging that teacher preparation programs be competency-based, and that the requirements for initial certification be based on demonstrations of competence to teach. In these times, however, we cannot expect to make substantial and massive improvements in the quality of education by improving the competence of beginning teachers. The teacher surplus substantially lessens opportunities for beginning teachers to enter the educational system. Further, the declining birthrate is reducing the size of the school population. Positions will be available to prospective teachers mainly as teachers retire. The present teaching force is relatively young; its average age has been estimated as about 35 years. It appears, therefore, that the teaching force will become increasingly stable, gradually aging over a decade with relatively few replacements in the immediate future.

If we consider the changed nature of the teaching profession, the economic conditions under which it will exist for the next two decades, and the fact that a very large proportion of teachers have completed most of the formal requirements for maintaining their positions, it is obvious that there is little hope of improving the quality of education by improving the competence of beginning teachers or by requiring more formal education either of beginning teachers or of experienced teachers.

The Need for a Cooperative Effort to Improve Teaching Competence

Everyone recognizes that the knowledge base for improving teaching competence is limited. It is this lack of knowledge that has promoted the formation of the National Commission. Although almost everyone agrees that focusing attention on the competence to teach is necessary, they are equally sensitive to our inability to specify precisely what this competence ought to be.

We cannot, however, afford to build this knowledge base in our traditional ways, with scattered research projects in a variety of places each of which may have significance in itself but bear little or no obvious relationship to each other, and from which the results are not likely to be **cumulative**. Further, if we wish to succeed in improving teaching competence, we can do so only with **full teacher cooperation** and by their **participation** in the research and development effort.

Furthermore, the creation of a joint effort to determine what constitutes teaching competence and to use the results of this research in the improvement of experienced teachers requires the effective support, stimulation, and **leadership of the states**. We have seen the competency-based movement spread rapidly because states became interested in its concepts and began to change the requirements for certification. A comparable system of support and leadership from the states is required if we are to shift the focus of the competency-based movement to the improvement of teaching in schools today. We are proposing, therefore, the formation of a consortium of states which will work together on the problem of improving teaching effectiveness.

There are obvious practical advantages for this type of coordinated effort. The improvement of teaching competence requires the achievement of three goals: (1) the **identification of competencies** which have been shown to be significantly related to the improvement of children's learning; (2) the development of a **system for training** experienced teachers in these competencies; (3) the creation of **information systems** within schools which provide administrators and teachers with data on teaching performance and student learning that can be used for diagnostic and training purposes. A coordinated effort would provide for exchange of materials, techniques, and instruments in an efficient way, with avoidance of duplication of effort.

Most importantly, the creation of a consortium would be a visible sign that the improvement of teaching effectiveness was a matter of **major public policy and commitment.** The direct involvement of the states and teachers and administrators within the states in a concerted effort to improve teaching competence will allay public concern that the profession is not willing to take upon itself responsibility for improving its effectiveness. The comprehensiveness and quality of the effort will ensure that its results will have credibility.

The National Commission can contribute to the support of this effort and to the acceptance of the results of the work undertaken. The Commission is composed of a variety of national leaders in research, in education, and in public affairs. The Commission is a group of individuals who have committed themselves to the creation of a national research and development effort to improve teaching effectiveness. Their joining together with a consortium of states brings to the effort visibility and public recognition on a national basis that should inspire confidence and support from legislators and the public generally.

The Organization of the Consortium

The Consortium will be composed of those states which choose to join in the national program to improve teaching effectiveness. Initially, the Consortium will be composed of those states who have or are planning well-conceived programs for teachers and administrators designed to improve teaching effectiveness.

The Consortium will be a **joint activity** with the National Commission on Performance-Based Education. The Commission will serve as the research and development arm of the Consortium.

A **Council** of the Chief State School Officers of the participating states will serve as the policy-making and administrative center of the Consortium. Each participating chief will appoint one or two staff members to the Planning and Evaluation Staff; members of the National Commission's research and development staff will also be members of the Planning and Evaluation Staff.

The **Planning and Evaluation Staff** will be responsible for designing the coordinated plan that integrates the projects of the various states. They will also be responsible for making recommendations to the chiefs for new program developments and for modifications in overall plan. They will provide the chiefs with analytic and interpretative reports.

This council of chiefs and staff will be the responsible agent for the development of the Consortium, for monitoring its activities, for exchanging information, and for interpreting the results of this work to policy-making agencies. The chiefs and their staff will meet four to five times a year to engage in the planning process, to determine what types of information is needed to improve programs, and to plan for disseminating the results and interpreting the implication of these results.

Each member state will create one or more centers for the improvement of teaching effectiveness. These centers will be groups of schools working on the improvement of teaching in their complex. Each center will focus on particular approaches to the problem of improving teaching effectiveness.

Some states, for example, have chosen to improve school and teacher effectiveness by creating programs designed to improve the competence of **administrators**. Other states have planned to create new training programs for **teachers** designed to improve their competence. Yet other states have created centers which will increase teaching effectiveness by improving the quality of the **instructional materials** and programs in schools. Each state will bring together a group of people who will be responsible for developing a plan using one or more such approaches. The focus of this planning should be on relating the particular approach specifically to the improvement of teaching competence.

The National Commission will contribute its research and development staff for the evaluation of these efforts to improve teaching competence, especially in defining the types of teaching competence that would be affected directly by a state's approach. If, for example, the approach is to make curricular materials and programs available to teachers, the research and development staff of the Commission will help identify those teaching competencies that are required to **use** the program.

The local and state staffs and the Commission will work together: (1) to develop the **measurement systems** for measuring teacher knowledge and performance and for measuring the learning of students; (2) to create and carry out the **research design**; (3) to conduct the data analysis; and (4) to provide reports on the results of the research.

The center program should extend over at least five years. Initially each center will have its own special focus; but, as knowledge is shared among the states the programs can be modified in succeeding years. By the end of five years there will be a series of centers across the country.

Figure 1 provides the organizational chart of the Consortium. Goals, administrative policies and program strategies will be developed by the Council of Chiefs. Detailed planning of the coordinated plan and the design for its evaluation will be the responsibility of the Planning and Evaluation Staff. Technical expertise on design, measurement, and data analysis will be provided by the National Commission's research and development staff. Each state will create its own planning and evaluation staff to work with the Consortium's Planning and Evaluation Staff.

The concept underlying this joint program is that each center will focus its efforts on improving effectiveness through a **particular strategy.** If, for example, the strategy is to improve administrator competence which in turn is expected to influence teacher effectiveness, that program should be able to state what can be done by this procedure within no less than two years with a sufficient degree of reliability that its particular program can be used more broadly. At the same time another center could be focusing on specific kinds of inservice training programs.

As knowledge becomes available about the strengths and limitations of each approach the consortium members can then create a second generation program by exchanging information. For example, if it is found that improving administrator competence increases teaching effectiveness by a certain amount and that certain kinds of inservice training programs improve teaching to a particular degree, these two approaches can be combined in various ways to see what their total effect might be.

The overall research and development strategy is to pick a particular focus for improvement that a state thinks promising, and then, within a relatively short period of time, estimate how much improvement is **actually obtained** by that approach. Once that information is obtained, combinations of approaches can be used so that within another two-year period the effects of a more comprehensive program can be estimated. Thus it is reasonable to expect that, by the beginning of the fifth year of this effort, prototypes and models of these training and development systems will have been created.

It is important to recognize that any research and development program of this kind will always be producing some knowledge that will

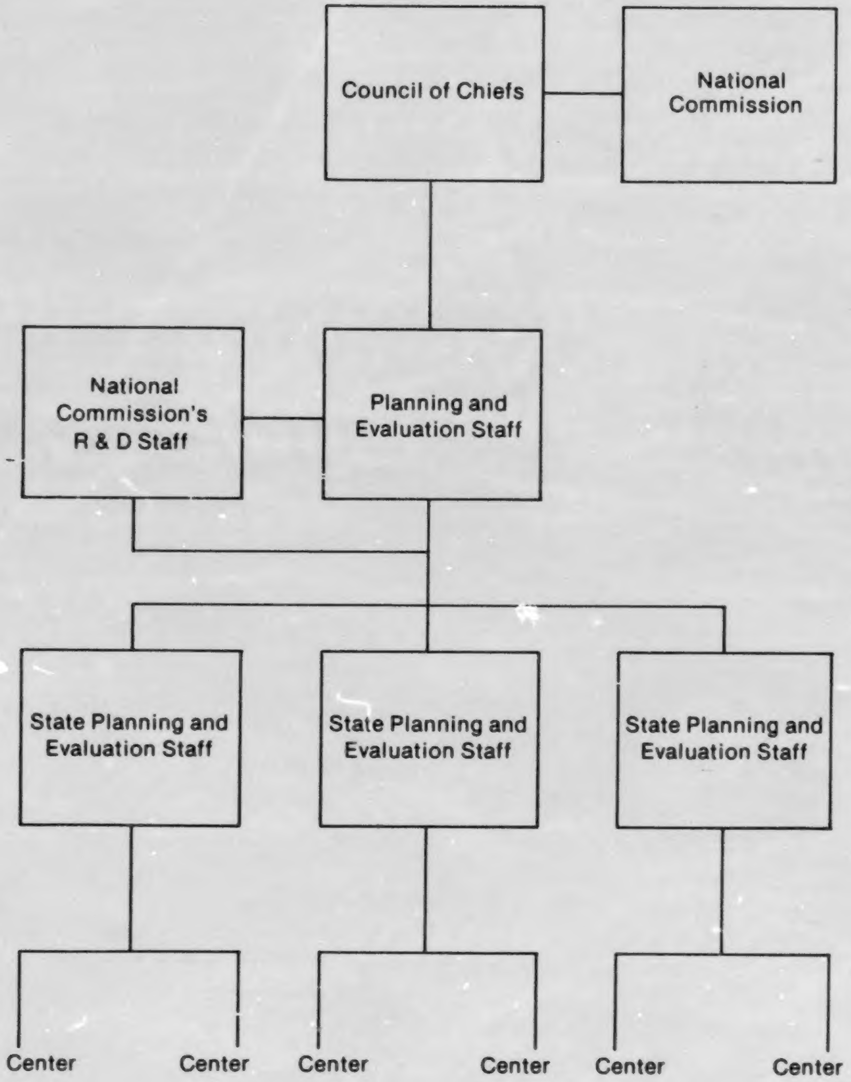
Council of Chiefs
National Commission
National Commission's R & D Staff
Planning and Evaluation Staff
State Planning and Evaluation Staff
State Planning and Evaluation Staff
State Planning and Evaluation Staff
Center
Center
Center
Center
Center
Center

Figure 1
Organizational Chart of the Consortium of States

be **immediately usable.** It will not be necessary to wait five years before the work of these centers can be disseminated more broadly. For example, if a particular training program to improve teaching effectiveness in the teaching of reading produces significant increases in student learning, such a program ought to be used more broadly. Thus the research and development strategy is a combination of producing knowledge about effectiveness which is immediately usable and, by continually using this knowledge to build new programs, create more powerful strategies for improving the quality of education.

The Consortium at the State Level

Each state will decide on a particular area of improvement in student learning; for example, one state may decide that the improvement of the development of **early education** programs is a necessary step for improving the quality of education. Another state may decide that its initial efforts will be focused on the improvement of children's learning of the **basic skills in the elementary school.** Another state may decide that the primary focus of its activities will be on the improvement of **administrator leadership** qualities and competencies.

Each state will then organize a **complex of schools** which will work on this particular problem. For example, if the goal is to improve teaching effectiveness in the teaching of reading and mathematics, the administrators and teachers in these schools will participate in the training programs to be developed by centers that the state is creating.

The next step will be for the center's staff and the research and development staff of the Commission to **generate the design for the research and development program** that will be embedded in the training strategy and systems. Probably the best organizational arrangement is to create a research and development staff composed of the Commission's staff and state and local personnel which will supervise the creation of the research plan and will be responsible for its conduct and monitoring.

Each state and local complex will create its own **system of advisory boards.** The National Commission will serve as an advisory board to the project itself because of its national character and broad-based membership.

Steps in the Development of the Project

The National Commission and the member states will jointly seek the funds for the formation of the Council of Chiefs and the Planning and

Evaluation Staff and for a six-month program planning phase. The Commission staff will work with the Council and Planning and Evaluation Staff to create the coordinated program of the Consortium.

Each state should generate **within a six-month period** its specific plan which will include the strategy that it proposes to use, the training sites in which the plan will be carried out, and the research and development plan by which the impact of the strategy will be evaluated.

Within this same six-month period the staff of the Council of Chiefs should meet regularly to develop the coordination and integration among the various plans, and its relationship to the total plan.

The **next six months** should be devoted to the start-up of each state's program. The six-month planning period for start-up time simply recognizes the reality of the difficulty of getting programs going. One, however, may be much more optimistic about the time needed for start-up because each of the states in the Consortium now has work underway which will be the initial focus of interest. Thus, although a year is envisioned as the amount of time needed to create the system by which an operational plan will be carried out, one might expect that each of these plans would be initiated sooner than that depending upon how much development work has already been undertaken in a particular state.

Years two and three will be the first generation phase of the program. At the end of this period of time plans will be made for the redevelopment of a second generation program in which elements from various states' programs are combined into new programs. Thus, by the end of the fifth year model systems should be in place.

Summary

The creation of a joint effort between a Consortium of States and the National Commission on Performance-Based Education to create a national research and development effort to improve teaching effectiveness is proposed. Each state will, in effect, be a particular approach to the problem of improving effectiveness and the combination of approaches will represent a range of efforts that may be made.

The development of strategies and programs moves through two phases: (1) the initial phase creates a program with a particular focus on administrator training, curricular improvement or direct training of teachers to improve their effectiveness or combination of these; (2) second generation programs test further developments of these approaches.

PROPOSAL FOR A CONSORTIUM OF STATES TO DEVELOP A NATIONAL PROGRAM TO IMPROVE TEACHING EFFECTIVENESS

The program will be carried out through a **network of schools** in which a total effort will be made to improve the quality of teaching in those schools. The selection of schools in each state will represent a variety of kinds of schools, pupils, and communities.

The **program development goals** of this project are to create new systems for improving teaching effectiveness. To achieve these goals teachers and administrators will participate in the development and conduct of the programs. Information systems will be built which provide administrators and teachers with data on teaching effectiveness. In general, the program development goal is to create systems for improving teaching effectiveness that are practical, efficient, and reasonably economic.

The **research and development goals** are to provide the knowledge base derived by studying the effects of the various training systems so that what eventually becomes the training system will have a solid foundation in data. The research and development program will identify what constitutes teaching competence and how to measure and evaluate it. The program will also identify those kinds of school conditions that need to be modified if teachers are to be effective.

By bringing together the states and the National Commission, it is expected that the results of this work will significantly influence decisions about schools. The range of decisions that are potentially likely to be influenced by this effort are those related to how teachers will be certified, how they will be evaluated before tenure, what kinds of training are needed for teachers and administrators, what types of curricular materials facilitate teaching effectiveness, and what characteristics of administration are needed to improve effectiveness. It is also likely that such information will provide a base for making decisions about financing of education that will meet the needs for providing for equal educational opportunities, for equally effective education, and for accountability of the educational professions.